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TREATMENT OF DIABETES WITH SPECIAL REFERENCE TO INSULIN

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The discussion of the treatment of diabetes mellitus requires a fair knowledge of its etiological factor and its metabolism. I would, therefore, like to mention very briefly a few applied facts about the physiology of metabolism and its alteration in diabetes mellitus, before discussing the different sections of its treatment.

Metabolism in Health

Metabolism is an essential phenomenon, a most important manifestation and fundamental characteristic of all living beings. It is the sum total of the chemical changes that occur in living tissues. It sub-serves three principal functions: (1) It enables to keep the body in state of nutrition. (2) It contributes to its normal growth. (3) It makes it capable for exertion necessary for meeting the stress and strain of life. These chemical changes are of two types—(a) constructive or anabolic. (b) destructive or katabolic.

The main kinetic force of this process is oxygen which unites with food-stuffs and destroys them by oxidation. Hydrolysis plays a much minor part. As yet the last word is not uttered about metabolism specially about the nature of altered metabolism in diabetes mellitus. Results of altered metabolism are rather firmly established but as to the exact nature of the intermediary process, we are yet in darkness. There are different schools of thought about it, based on different experimental findings. Though the views of the different schools are apparently dissimilar, probably the differences are more apparent than real. Possibly in future, discoveries of few missing links may do away with the antagonisms when all will present a common front. To avoid confusion I shall try here to base my discussion on the most accepted views. The processes of oxidation and hydrolysis entail expenditure of some energy. The materials which are metabolised are derived from the food-stuffs comprising protein, carbohydrate and fat. Water, salts and vitamins play parts in nutrition of the body but for all practical purposes are not at all energy-producers. The differences in chemical composition of protein, carbohydrate and fat necessitate different amounts of oxygen to burn them and that at expense of different amounts of energy. This burning up of different food-stuffs results in liberation of different amount of energy, or fuel, which is expressed in calories. Protein is the nutritive substance of first order. It alone can generate new protoplasm for the growing tissues and replace protoplasm of tissue wasted by malnutrition or disease. It also acts as a source of energy necessary for body activities and further

metabolism. Carbohydrate or sugar is specially suited to act as a calory-producer because of the ease with which it is oxidised that is, its oxidation involves expenditure of least amount of energy (one molecule of glucose yields 6 molecules of O_2, an element so essential for metabolism). The most conspicuous use of fat in the body is to serve as a compact reserve fund of fuel. The storage of fat supplying definite amount of calories can be effected in 1/10th the space occupied by carbohydrate of an equivalent caloric value. It is however burnt with greater difficulty, that is, more energy or fuel is spent in its oxidation. For the sake of economy body uses carbohydrate as fuel on which fat and protein are burnt. One gram of protein and carbohydrate liberate 4 calories each, while fat liberates 9 calories per gram (an average man utilises about 2500 calories a day). The metabolism can be carried out most economically if a definite proportion of amount of anti-ketogenic to ketogenic food is kept, say 1 to 1·5 or so. Carbohydrate contains 100% anti-ketogenic property. Protein contains 58% anti-ketogenic and 42% ketogenic, whereas fat is only 10% anti-ketogenic and 90% ketogenic. This mechanism of economy is admirably compared to the economy of petrol consumption in a motor car. In the carburettor a proper proportion of petrol and air should be arranged in order to get the maximum amunt of gas and energy out of petrol combustion. That gas is utilised to the maximum advantage if there is no leakage in the cylinder by piston rings. (Here petrol is compared to carbohydrate and air compared to protein and fat).

Metabolism in Diabetes Mellitus

At present the view that is most accepted is, that diabetes mellitus primarily and mainly involves an impairment of normal utilisation of carbohydrate. Less fuel is placed at the disposal of the body causing a subsequent disturbance in fat and protein metabolism resulting in incomplete combustion of fat with ketosis, a condition of greater danger than the original disorder. In a compensatory attempt to supply more fuel there is additional break-down of tissue protein. This primary disorder of carbohydrate metabolism, as far as our present knowledge goes, is chiefly due to insufficient secretion of insulin by islets of Langarhans. The association of other factors responsible for the non-utilisation of sugar and the details of the method of utilisation of sugar by insulin are not yet definitely known. The methods of investigations at our disposal are yet limited. Future researches with more elaborate investigations may possibly throw more light on their nature. The whole pathological condition, therefore, resolves into: Less insulin —less utilisation of carbohydrate—less fuel = (a) incomplete combustion of fat—ketosis and (b) compensatory breakdown of protein—rapid wasting.

General Principles of Treatment of Diabetes

It is not possible to deal with the discussion of treatment in details, so I have tried to give only the outline of treatment and the principle on which it is based.

The fundamental and ideal aim of treatment is one—*i.e.*, to restore the capacity of the tissues to burn sugar.

This end may be achieved by relieving the strain on perverted metabolism in one of the two following ways either singly or in combination.

(1) Managing the whole metabolism in an economic way, on the one hand by cutting short the caloric requirements of the body as far as practicable, on the other hand by adjusting proportions of different food-stuffs in such a way as to enable smaller amounts of fuel at disposal to completely burn the requisite amount of fat and protein necessary to meet the body requirements. Here we may again bring in the analogy of petrol-economy. To bring down the petrol bill we have to adjust on the one hand the optimum proportion petrol and air in the carburettor on the other hand at the same time we will have to use the car during bare necessities and have to avoid any joy-ridings. The body is fortunately naturally gifted with reserve power in all its functions. It usualy metabolises more than is really necessary, that is, it cooks more food, therefore uses more fuel than is necessary. So if the impairment of carbohydrate utilisation, that is, the fuel, falls short to a limited extent we can readjust our caloric requirements and the different food-stuffs without injury to our health, that is, in mild diabetes we can manage the case with dietetic treatment alone.

(2) It is when the shortage of fuel is greater, that is, in more severe cases, that we require help of fuel from outside which is very ably supplied by administration of insulin.

INSULIN

History: The discovery of Insulin by Banting and Best in 1922 revolutionised the treatment of diabetes mellitus. It is one of the most effective therapeutic agent. Besides digitalis in cardiac insufficiency and liver in pernicious anæmia, there is hardly any therapy which can be compared in a parallel way. The introduction of insulin therapy has removed the dread of the disease and has immensely improved its prognosis. It influences very favourably upon the duration of life and mortality in diabetes. Its most triumphant achievement is in the treatment of diabetic coma. It is also very helpful in cases of associated complications and intercurrent diseases. However it is only a substitution therapy which introduces from without a substance which is manufactured in insufficient quantity within the body. The real route of the trouble therefore persists. However, in many of the mild cases where anatomical and functional damage to the insular apparatus is slight and not progressive, judicious administration of insulin gradually increases their carbohydrate tolerance leading them in the direction of true cure provided they subsequently lead a careful life by always respecting the insular apparatus. On the contrary in grave cases of quickly progressive injury to the pancreas insulin therapy becomes helpless.

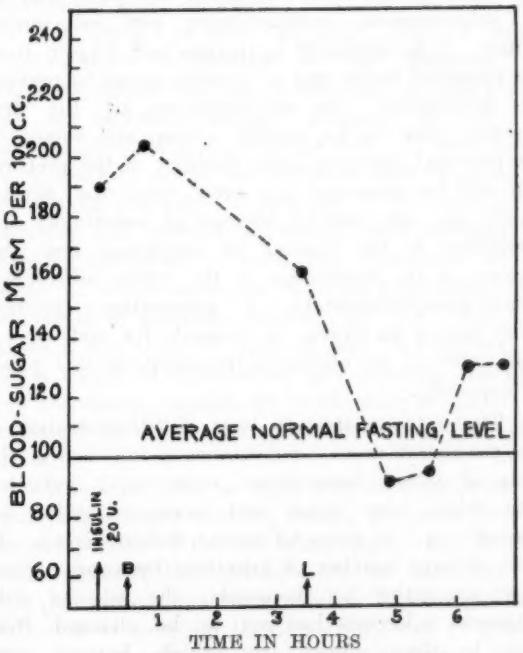
A precautionary note during the insulin-treatment, however, must be borne in mind by the doctors and the patients alike. Insulin is only a substitution-therapy with its prospect and limitation. For real attempts towards cure metabolic economy is essential. Dietetic treatment should always be carried out side by side though the rigidity of dietary may be a bit relaxed for giving insulin some play in its action. But indulgence of the patient in taking a very liberal and luxurious diet to satisfy his gluttonous propensities and to cover up the margin of the extra diet by the big dose of insulin should always be severely deprecated. This practice entails a general increase in the metabolic activities of patients thereby taxing the already strained machine of metabolism, the efficiency of which grow from bad to worse with a risk of eventual destruction requiring gradually increasing dose of insulin. Doctor Lawrence has very aptly drawn analogy of this practice to that of adding another extra cylinder to a damaged motor car and run it too fast resulting in further damage to the machine, necessitating the addition of a further cylinder to run it, the vicious circle ultimately ending in complete wearing out of the machine.

The patient must be clearly made to understand that in order to get the utmost and stable benefit from insulin treatment, the diet question can never be overlooked and there must be a constant relationship between quantity of food and the dose of insulin.

Pharmacological Action: Insulin is the active principle of islands of Langerhans discovered by Banting and Best in 1922. It is employed clinically in the form of insulin hydrochloride. It is soluble in water, stable in acid solution and rapidly destroyed by pepsin and trypsin. It is related chemically to sulphur containing amino-acids—cystin.

Its mode of action is principally anabolic, activated by the anabolic set of nerves, the parasympathetics. It has three main actions:—

(1) It enables tissues to burn glucose, the sugar ultilisation reaching its maximum within 1 to 5



B-Breakfast, 15 gm. Carbohydrate
L-Lunch, 15 gm. Carbohydrate

CHART I-INSULIN BLOOD-SUGAR CHART.

—(*Clark's Pharmacology*).

hours of its administration according to its dose and route of administration, usually an ordinary dose of 20 units by hypodermic route has the maximum effect after three hours. In this matter some cases are more insulin sensitive while others are more insulin resistant.

(2) It promotes glycogen-formation in the liver and muscles.

(3) It inhibits sugar formation from protein.

The exact mode of these actions is still uncertain.

Dosage, Method and Time of Administration: The dosage of insulin has been ascertained not by weight but by biological assay. It is indicated by units. A physiological unit is that amount of insulin required to reduce blood-sugar of a 2 kilograms rabbit from normal level to 45 mgm.% in about 5 hours. The clinical units is about 40% of the physiological unit. On an average one unit of insulin enables the patient to utilise about 2 grams of sugar.

Absorption of insulin can take place from the mouth, rectum, vagina and under the skin, that is, by subcutaneous, intramuscular and intravenous routes. It is destroyed by pepsin and trypsin from the intestinal tracts and no coating seems to prevent this destruction. The administration by the first 3 routes (that is, by mouth, rectum and vagina) is not practical, for very large quantity of the preparation will be necessary and even then the clinical results are very variable because of uncertainty and variability in the degrees of absorption and also because of the destruction of the active substances. Insulin-phosphotungstate, a preparation commercially known as Oralin, is available for oral use. I shall refer to its utility in treatment in this paper subsequently.

The only satisfactory way of administration is the parenteral route. Subcutaneous injection is the route of choice, intravenous route being indicated only when very quick and massive results are wanted, *e.g.*, in cases of severe diabetic coma. In view of large number of injections necessary sometimes amounting to thousands, the site of subcutaneous injections has got to be changed from time to time, upper arm, thigh, buttock even chest and abdomen being used in succession.

An average dose of 20—30 units by hypodermic route produces maximum effects usually in about 3 hours. After ingestion of carbohydrate diet, maximum absorption of glucose also takes place by 3 hours. So it is best to give insulin ½ hour before a carbohydrate meal so that maximum insulin action will coincide with the maximum absorption of total glucose in the blood, an undue fall of blood-sugar is thus checked.

Indications: There is no universal agreement on this point. Relative indications vary widely in the hands of different clinicians of repute. It varies between the rigid school of adherence of British Medical Research Council to the absolute signs and symptoms on the one hand and the liberal schools of giving insulin to all diabetics irrespective of its nature and severity on the other. Even prophylactic treatment in very mild cases has actually been advocated by some authors.

(1) It is, however, definitely indicated in all cases where patients cannot utilise sufficient amount of diet for adequate nourishment without glycosuria and ketonuria. (These cases are termed severe).

(2) In all cases of diabetic coma, actual or imminent.

(3) In diabetic complications including surgical and during intercurrent illness.

(4) Mild cases, manageable by diatetic restrictions alone may temporarily pass on to a stage of greater severity and require help of insulin from outside. This necessity usually arises when the patient's general condition deteriorates or when an intercurrent illness crops up.

Classification of Diabetic Cases

Classification of a diabetic as to the severity is generally based rationally on tolerance to carbohydrate metabolism. Mild diabetics can be kept without glycosuria and hyperglycæmia with requisite amount of diet without the help of exogenous insulin. By requisite amount is meant a diet fulfilling three essential points:—

(1) Yielding a total caloric value 20 to 30% above the basal metabolic requirements (To supply extra energy for doing ordinary works of life).

(2) Containing a sufficient amount of protein about one gram of protein per kilogram of body weight. (To supply and supplant protein necessities of body).

(3) Having the different proportions of protein, fat and carbohydrate in such a ratio as to

yield one part of anti-ketogenic to about 1·5 part of ketogenic properties (for economy of metabolism).

To come back to classification besides the mild ones there is the 2nd class, that is, severe cases who will necessitate help of insulin from outside to maintain such metabolic efficiency. The amounts of exogenous insulin required vary according to the different grades of severity. When a small amount of exogenous insulin is required, the case is moderately or mildly severe. In case of bigger requirements the case is a pretty severe one. Classification is rough, there being no hard and fast line of demarcation, one passes on to the other. The 3rd class comprises very severe cases with progressive injury to the pancreas which do not yield even to large amounts of insulin.

Besides the classification based on insulin requirement, the severity of the case can also be judged from—

(1) Severity of the cardinal symptoms.

(2) The amount and persistence of sugar and ketone bodies in the urine.

(3) Fasting blood-sugar level.

(4) Behaviour of blood-sugar level after ingestion of glucose, *i.e.*, sugar tolerance test curve.

A. TREATMENT BY INSULIN

I. Treatment of Diabetic Cases Proper

Treatment may be conveniently divided into two periods, *viz.*, (1) period of dietetic treatment and (2) the period of insulin treatment.

The 2nd Period is divided into two stages:

(a) Stage of balancing ending in stabilisation.
  (i) till glycosuria disappears.
  (ii) till hyperglycæmia is rectified.
(b) Stage of routine care.

I am not touching on the dietetic portion of the treatment. In these groups of cases, however, dietetic and insulin treatment go hand in hand. To get the best results we should aim at keeping the blood-sugar level near about normal by proper dose of insulin and proper spacing of time of injections and keeping a certain definite relationship between dose of insulin and adequate diet which varies individually according to carbohydrate tolerances.

(a) Mildly Severe Cases: In these cases we start dietetic treatment alone without insulin. If during this period sugar persists in the urine before adequate dietary is reached, we know insulin must be given. In this group of cases usually the dietary reached before the commencement of insulin is almost near the mark, so comparatively smaller amount of insulin would be necessary to utilise an adequate diet. It should be remembered that the degree of glycosuria and insulin requirement is related and the relationship varies somewhat in different persons and even in same person from time to time. Usually one unit of insulin may be administered for each two grams of sugar excreted in 24 hours' urine. This calculation serves an useful though a rough guide of the amount of daily requirement of insulin.

Period of Balancing: Before starting insulin it is essential to have the fasting blood-sugar done, notwithstanding the presence of sugar in the urine, which is usually found to vary from 0·15% onwards in this group of cases of mild severity. According to the blood-sugar level to start with 5 to 10 units of insulin should be given for the first two or three days, once or twice a day half-an-hour before breakfast and supper. The urine should be examined daily for sugar before every morning injection of insulin, preferably also before insulin if the morning urine contains a trace of sugar. After two or three days in these groups of cases the same dose of insulin utilises more carbohydrate so that gradually and tactfully further amount of diet can be added without any additional insulin. Examine the urine and see the effect of this additional diet. If more insulin is required to utilise the additional diet the dose has got to be gradually worked up by 5 units in the morning and evening alternately until morning and evening specimens of urine are sugar-free. At this stage 24 hours—specimen of urine examination may be useful to ascertain whether at any other time there is any trace of sugar or not. We should wait for a couple of days before each morning and evening increment; usually 20 to 30 units of insulin are sufficient to utilise the adequate dietary in these cases.

When the urine is sugar-free with adequate diet and proportionate dose of insulin we enter into the second portion of the balancing stage. In this stage more frequent blood-examination is necessary. At this point we must have another blood-sugar examination to ascertain the threshold value of glucose. The amount of insulin and diet which the patient is already receiving should be kept on for two or three days at the end of which blood-sugar should again be examined when commonly it is found to be lower showing better utilisation of carbohydrate

with the same amount of insulin. The evening injection at this stage should be made at least 5 hours before the patient goes to sleep to avoid hypoglycæmia during sleep. When the blood-sugar level is lowered to near the normal level the doses of insulin should be gradually reduced. The reduction of doses is made generally in the reverse order to that of its increase. The evening dose is first cut off and then the morning dose. The diet should be kept constant and the urine examined daily according to the principle stated above. After sometime the improvement in the sugar-tolerance will be such as to require either a very small amount of insulin, say 5 to 10 units daily, or no insulin at all for utilisation of an adequate diet. If after a fortnight's observation, the tolerance remains the same with an adequate diet and a definite amount of insulin, the diet and insulin ratio is thought to be stabilised. It should be remembered that even after stabilisation spontaneous variation in carbohydrate-tolerance may occur from time to time and necessitates readjustment of the diet and insulin ratio.

Routine care. After stabilisation the patient usually goes out of regular care of physicians. Before that he should be advised on the following points as rules for guidance of his routine care.

(1) To take adequate care of his general health.

(2) To stick rigidly to the advised diet and the exact diet-insulin ratio if he is taking insulin.

(3) To consult his physician once a week or fortnight with urine (passed 2 hours after meal) examination report, if possible, also with a fasting blood-sugar report.

(4) To consult his physician in case of any intercurrent illness specially those related to gastro-intestinal system (ordinarily 90% food absorbed, in gastro-intestinal disturbance much less absorption, therefore risk of relative over-dose of insulin).

(5) If he is taking insulin to explain to him the earliest symptoms and remedy of hypoglycæmia, that is, rest in bed and immediate intake of some sugar. However, the amount of insulin taken in these cases is so small that risk of hypoglycæmia is remote.

There is an effort of treating these cases with insulin with urine examination alone but *without blood-sugar* examination. At least one preliminary blood-sugar examination is necessary to establish diagnosis. As long as the urine contains sugar dosage of insulin is increased gradually on the same principle as above stated but when the urine is sugar-free, further increase of dosage is done much more cautiously, *i.e.*, by one unit only every other day and keeping a strict watch on the earliest hypoglycæmic symptoms to indicate stopping further increase or actually diminishing the dose. This method, however, is imperfect and associated with disadvantages and risks.

(b) Pretty Severe Cases: These are cases requiring a pretty large dose of insulin 40 to 50 units or more daily to utilise an adequate diet. On the very first day of the examination of the patient, from the loss of weight, intensity of symptoms, heavy amount of sugar and possibly also of the ketone bodies in the urine we can ascertain the severity of the case. High blood-sugar and sugar tolerance curve, refractory behaviour of the patient's condition to dietary treatment in the first two or three days, will corroborate the condition. We should not then lose time by trying dietetic treatment alone but also begin insulin treatment at once, specially so if there is ketonuria. The quantity of insulin necessary should be estimated gradually, we can however have a fair idea of its daily dose from the dictum already stated, that is, one unit of insulin for each 2 grams of sugar passed in 24 hours' urine. We can proceed in two ways:

Either (1) continue dietetic treatment and gradually reach requisite diet covering it with administration of gradually increasing proportionate dose of insulin. Or (2) give the requisite diet at once with larger daily dose of insulin.

The first method is generally advisable unless the case is a very severe one or unless there is threatened acidosis or coma. It helps the economy of metabolism and possibly improves the carbohydrate tolerance. The *balancing* period is carried out in the same way and on the same principle as in the mildly severe cases detailed above, with the following additional points which should be carefully borne in mind:

(1) Larger doses of insulin would be required in these cases. The degree of each increase in dose should be greater than that in the preceding group, about 10 units every other day instead of 5 units.

(2) It is usually unwise to give more than 20 to 25 units in single dose to avoid the risk of hypoglycæmia.

(3) If the total daily dose reaches 60 units or more, the dose should be split into 3 portions, the morning dose being little bigger than others and every dose being followed by appropriate amount of diet. The interval between the two successive injections should not be less than 5 to 6 hours as the maximum lowering of blood-sugar may occur in about 5 hours after an injection.

(4) The threshold level of blood-sugar is high and it is often necessary to increase the dose of insulin appreciably to force the blood-sugar down to near normal level. Some cases, specially those with associated renal disease, behave in a refractory way to relatively big doses of insulin. In that case we should be satisfied with a sugar-free urine and a blood-sugar brought down to about 0·15%. In these groups of patients metabolism is adjusted on a much higher blood-sugar level. Usually they feel uneasy by way of lethargy, general weakness, etc., if the blood-sugar is forcibly brought down to near about normal level. They do much better at a relatively higher blood-sugar level, actual amount varying in different individuals. We should not try to bring the level below this. (cf., high B. P.).

(5) In these cases if blood-sugar is *suddenly* brought down, there is risk of hypoglycæmic phenomena even when the blood-sugar is above normal level, say 0·12, 0·14 or so.

(6) In rare cases it is very difficult to remove the last traces of sugar from the urine. In other rare cases again sugar disappears from urine but ketonuria persists in spite of big doses of insulin. In latter group of cases, natural tendency to acidosis is very strong and ordinary carbohydrate content of the requisite diet is not sufficient to remove them. More carbohydrate should be given with the same dose of insulin and the ketone bodies will gradually disappear from the urine.

Routine care: After the insulin and diet is balanced and adjusted, patients should be impressed upon the necessity and importance of routine care on the same lines as mentioned before in the mildly severe cases. There is however a vast difference between this group and the former one. In this group is required for a number of years, probably for the rest of life on the one hand, daily administration of a much larger quantity of insulin with corresponding increased risk of hypoglycæmia, on the other hand, a continued stricture on the extravagance of diet, both qualitative and quantitative. The disease cannot be cured but the expectation of life can be prolonged. In addition, the question of expense for the medicine also comes in. For these reasons it is very difficult to secure the life-long continued co-operation of the patient which is so essential for success. The spirit of co-operation is often strained and even ruptured. After some months' treatment the rigidity relaxes, often the patient gets disgusted and gives up treatment to come back to the physician after a distinct set back.

In this group of pretty severe cases, the following additional points during the period of routine care must be remembered:

(1) The patient should be under closer medical supervision.

(2) He should have written orders from the doctors as to the exact quantity of food specially carbohydrate, its distribution throughtout the day, and the dose and distribution of insulin.

(3) He or someone in his family should be taught the complete technique of hypodermic injection and the exact amount of insulin to be injected.

(4) In adjustment of diet patient's favourite carbohydrate should be tried to exclude monotony.

(5) The adjusted diet and insulin ratio require readjustment after a certain time, specially so after some intercurrent illness. In any case readjustment should be done at intervals of 3 to 6 months according to the severity of the disease and reliability of the patient.

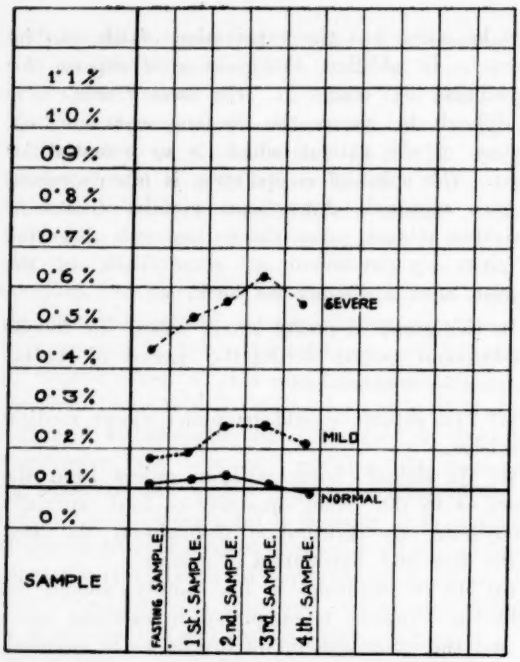
(6) The patient should be warned of three things:

(i) The exact proportion of insulin and diet should be maintained;

(ii) An alteration in the quality or in the reduction in the quantity of food might entail the risk of relative overdose of insulin;

(iii) In gastro-intestinal disturbances, the actual absorption of food is much below the actual intake of food entailing a risk of relative overdose of insulin.

(c) VERY SEVERE & PROGRESSIVE CASES: We now come to the 3rd group of severe cases. In the 1st group there is a tendency to cure with small doses of insulin. In the 2nd group there is no cure but a distinct betterment of prospect of life with a bigger dose of insulin. In this group, however, there is no prospect of the above two results. The case progresses unfavourably in spite of big doses of insulin and ends fatally sooner or later. They are mostly caused by a rapid and progressive lesion of pancreas. These cases fortunately are rare.



EACH SAMPLE IS TAKEN AT HALF AN HOUR INTERVAL. FIRST SAMPLE AFTER ADMINISTRATION OF 50 GRAMS OF GLUCOSE BY MOUTH.

CHART II - SUGAR TOLERANCE TEST CHART.

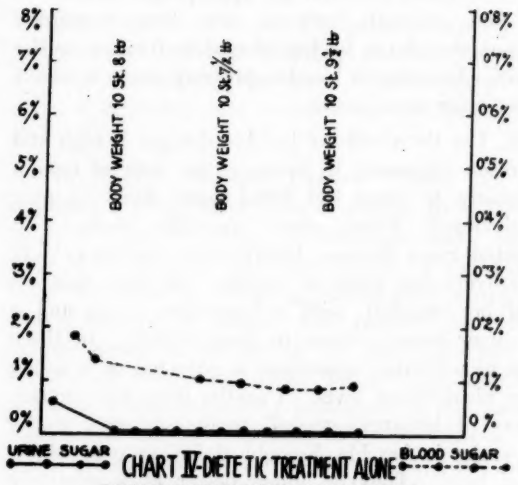


CHART IV - DIETETIC TREATMENT ALONE
BALANCING PERIOD CURVE - MILD DIABETES

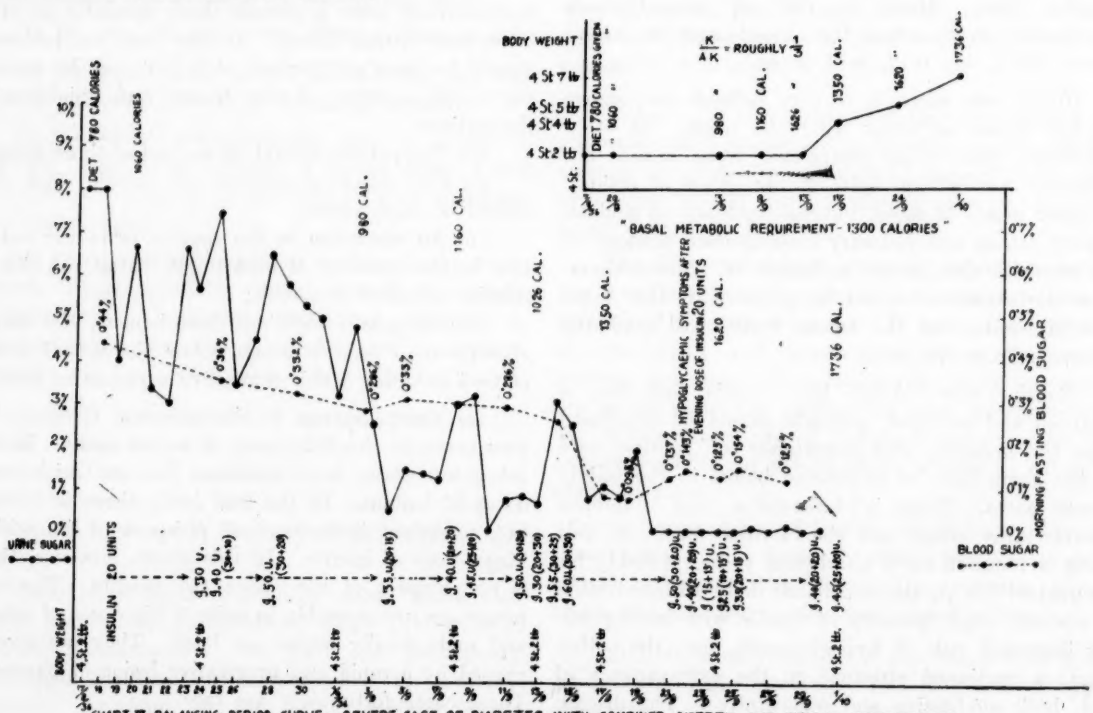


CHART III - BALANCING PERIOD CURVE - SEVERE CASE OF DIABETES WITH COMBINED DIETETIC AND INSULIN TREATMENT

II. TREATMENT OF DIABETIC COMA

It is in the treatment of diabetic coma with insulin that we are rewarded with most triumphant success. Compared to past statistics we find about 70% of such patients lost in the pre-insulin day should be saved now. When actual coma has developed, intensive treatment should be started at once for every hour lost makes the prognosis graver, and the damage done to the tissues becomes less and less reversible. Early diagnosis and treatment improves the prognosis immensely. It is most essential that the *diagnosis* is first of all firmly established and differentiated from similar symptom-complexes, *e.g.* uræmia, apoplexy and above all from hypoglycæmia, otherwise results of treatment would be disastrous. In all cases urine (catheter specimen, if so necessary), should be examined for sugar and ketone bodies. It should be remembered that under rare circumstances there may be two fallacies in urine examination: (a) Urine may be sugar-free in diabetic coma when the threshold value of glucose is very high; (b) In hypoglycæmic coma catheter specimen of urine may contain some sugar. It is the sugar which had been present in the bladder from sometime prior to the injection of insulin when blood-sugar was high. Blood-sugar estimation, however, avoids the mistake and should by all means be done immediately wherever possible. In July issue of *B. M. J.*, 1936, Dr. Laurence has given a very valuable chart stating the differential points of diabetic coma and hypoglycæmic coma.

The only way to combat coma and get rid of ketosis is by burning up large quantities of sugar, by repeated injections of fair amount of insulin and by supplying at the same time exogenous sugar to prevent hypoglycæmia. The other adjuncts in treatment are (1) to give sufficient amount of alkalies to facilitate quick removal of ketone bodies already formed, (2) to correct associated dehydration and (3) to counteract circulatory collapse.

Administration of Insulin: During the 1st 24 hours a very heavy amount as much as 150 to 200 units of insulin (in divided doses) may be required. For rapid and massive results the 1st dose may be given at once intravenously about 40 units if the coma is profound and acidosis is severe, otherwise given subcutaneously. If circumstances are not favourable at home, patient should then be sent to hospital for constant medical supervision. Injection of insulin should be repeated every 6 hours or so hypodermically, the dose being regulated by the degree of glycosuria before each injection. Usually 40 units for heavy sugar over 5%, 25 to 30 units for moderate sugar and 10 units for no sugar. When there is no sugar in the urine it is by far better to rely on blood-sugar. If this line is followed the danger of hypoglycæmia by insulin in coma is much less because of the small amount of endogenous insulin produced in such cases.

After the 1st 24 hours the daily dosage of insulin required is much less usually 50 to 60 units which should be divided into 2 or 3 parts given at equal intervals. If the patient does not improve within 3 to 4 hours after the 1st injection the prognosis is serious. Subsequent large doses of insulin usually cannot prevent a fatal end.

Administration of Sugar: Regarding administration of glucose in a case of diabetic coma there are two schools of opinion. Some authorities say there is enough of hyperglycæmia present in these cases, so no need of giving glucose from outside, but give insulin and have the blood-sugar done regularly; when blood sugar comes down give glucose from outside. But a very large majority prefers giving glucose from the very onset. In such a practice one certainly feels safer in giving big doses of inslin which is absolutely essential in these cases. The idea of glucose and insulin is always interlocked. The carbohydrate requirement of a comatose patient is very large, the sugar available in the body even in high hyperglycæmia is insufficient for this high demand, so exogenous sugar is necessary. There is no harm if we supply more sugar from outside than is actually necessary, the reverse is attended with risk. In the 1st 48 hours not less than 50 grammes of sugar should be given. If the patient is not totally unconscious give by mouth, if comatose, if the heart condition allows, give requisite initial amount by intravenous route 25% of 50 to 100 c.c., and subsequently intramuscularly 12½% of 50 to 100 c.c. In cases of marked dehydration and collapse where immediate restoration of fluid is necessary, glucose. 7½ to 10% in normal saline solution about a pint or so should be injected very slowly into the vein by drip method. This will cover about 35 to 40 grammes of sugar. In cases of less urgency injection of 5 to 7½% of glucose in saline may be given subcutaneously. The rectal route should be avoided in the 1st 24 hours for uncertainty of absorption. Later on 5% of glucose in normal saline may be given.

Administration of Alkalies: In acidosis due to other causes we can do very little by way of checking the formation of acid bodies and have to lay much more stress on getting rid of all the acid bodies by huge doses of alkalies. In pre-insulin days diabetic coma was placed in the same category. But after the discovery of insulin the aspect of ketosis has been changed and the outlook has immensely improved. In insulin and glucose we have a very efficient and quick method of preventing formation of acid bodies, so comparatively smaller doses of alkalies are given nowadays. Eminent authority like Joslin, even goes so far as to say that alkalies are useless in diabetic coma. However the consensus of opinion is for giving moderate doses of alkalies, about 4 grammes a day in divided doses. If the patient can swallow give by mouth, if there is urgency give it into the vein, 120 to 160 gr. to a pint with glucose, otherwise give rectally in about 1% strength. It should never be given subcutaneously or intramuscularly, otherwise sloughing may follow.

Administration of Fluid to Combat Dehydration: Body fluid may be lost by persistent vomiting of large amount of fluid and constant exhalation of moisture by air-hunger, etc. This associated dehydration is attended with serious risk for three reasons, firstly it leads to quick failure of cardio-vascular system; secondly it leads to very quick poisoning of tissues by stagnation of the toxic ketone bodies in it and by absence of supply of nutrition to it owing to sluggish circulation; thirdly, by failure of insulin to reach these parts in spite of administration of heavy doses, thus depriving the tissues of the only hope of recovery in bad cases. Dehydration should be counteracted on the one hand by treating and preventing loss of fluid as far as possible and on the other hand by replacing the fluid loss. So long as the toxic factors are there, attempts to prevent loss of fluid do not meet with proper response In case of severe vomiting wherever possible gastric lavage is recommended. On the other hand we get appreciably better results by efforts to replace the body fluid. Fluid is to be replaced by saline. In urgent cases, intravenous normal saline by continuous drip infusion, a large quantity 3 to 4 pints may be required. B. P. should come up to 100 mm. Hg. or more. Later on when the condition is improved or when intravenous injection is not possible or advisable, subcutaneous or rectal route by drip method should be resorted to. The indication of glucose along with saline has already been stated above.

Combating Circulatory Failure: Cardio-vascular stimulants like strophanthin, Euphyllin, solution of adrenalin chloride, Cardiozol, camphor group to be tried. Very bad cases of circulatory failure bring up further difficulties in treatment. There may be very little urine secretion for sugar test to regulate the dose of insulin. Owing to poor circulation and consequent failure of tissues to perform metabolic functions, large doses of insulin prove quite inert. Unless circulation can be made to improve, these cases become hopeless in spite of intensive glucose and insulin administration.

III. Treatment of Complications and Intercurrent Illnesses in Diabetes

All complications and intercurrent diseases, even a mild one, put a strain in economy of carbohydrate metabolism. The burden on this metabolism increases in direct proportion to the severity of diabetes on the one hand and the severity of complications on the other. A mild diabetic not requiring insulin having an apparently harmless complications, *e.g.*, pruritus, eczema, may not show presence of sugar in the urine but will improve readily under small doses of insulin, say about 10 units daily with proportionate amount of glucose internally (2 grammes per unit). This shows that a latent struggle for economy of carbohydrate metabolism was going on inside which was relieved by small doses of insulin and glucose. Complications of an infective nature are the most dangerous, acute infections like lobar pneumonia are more dangerous than chronic infections like chronic P. P. It rapidly but temporarily reduces carbohydrate tolerance further and in the improperly treated and untreated cases frequently precipitates ketosis and coma. In this connection I am quoting a dictum which is worth remembering. " If a diabetic whose urine has been kept sugar-free by proper treatment begins to have glycosuria on the same diet and insulin dosage as previously, the physician should immediately search for an infectious process even though the thermometer reveals no fever." Just as the complication and intercurrent illness injure the soils, that is, the diabetic condition, the devitilised tissue and hyperglycæmia similarly have a very deleterious effect on the complicating disease, thus forming avicious circle. In treatment we should lay equal stress on the two sides simultaneously, the septic

foci or the infection should be treated intensively with specific and other remedies. Regarding the treatment of the soil there is one principle in their treatment that is make the body utilise more carbohydrate temporarily so long as the complication or infection exists. This is done by giving extra insulin and proportionate carbohydrate. The dose is to be regulated by urine examination for sugar and acetone before each insulin injection and by blood-sugar examination. Blood sugar should be specially examined when the urine contains no sugar but albumin and casts, because the urine secreted by kidney simultaneously damaged by infection will give a false idea by showing comparatively smaller amount of sugar while the blood-sugar level is very high. The blood-sugar should be brought down as near the normal level as possible for it is the blood-sugar that devitalises the tissue and favours the growth of infective organisms in it and play a havoc in the system. A mild diabetic managing without insulin, developing an influenzal attack may require a small dose of insulin once a day during the course of illness, and infection of moderate intensity developing in a case who is already taking insulin would require substantial increment in its dosage which may be two to three times more than the usual dose. In severe infection with high fever unduly large dosage of insulin fails to reduce blood-sugar appreciably. In that case it is better to keep the blood-sugar level a bit higher than to give heroic doses of insulin to reduce it. If the daily dose is more than 30 units, it is split into two parts and if more than 50 units, into 3 parts followed by proportionate amount of carbohydrate.

In these cases it is not only important to know when and how to increase the dose of insulin, it is equally important to remember when and how to revert back to the precomplication usual dosage. The infective condition may begin to improve at any moment and the need of insulin rapidly abates. Unless this period is carefully watched and managed there is risk of relative overdose of insulin and consequent hypoglycæmia.

Regarding diet there should be a more liberal carbohydrate content at the expense of fat and protein.

Tuberculosis of lung complicating diabetes mellitus is rather common and deserves special mention. Usually they both act harmfully on each other. Human system is naturally an unsuitable soil for the growth of T. B. The natural resistance is lowered in diabetes. Once tuberculous infection occurs, it will always be source of burden on the carbohydrate metabolism, making the soil more vulnerable and thus a vicious circle is produced. The advent of secondary infection in P. P. will make the vicious circle more vicious. The amount of harm depends upon the severity of diabetes and the nature of P. P. We know patients suffering from chronic productive type of P. P. on the top of a mild diabetic condition live for years together without growing worse. On the other hand we are quite familiar with rapidly fatal course of a soft exudative type of P. P. complicating a moderately severe case of diabetes.

CHART V

Diabetes with Pulmonary Phthisis (Productive Type).

No.	Date	Urine Sugar	Blood Sugar	Insulin Quantity	Albumen	Casts	REMARKS
1	7-3-34	3·6%		10 units once a day	Trace	nil	Insulin 10 units once a day for a fortnight with regulated diet brought urine sugar to nil.
2	16-5-34	nil	0·097%		Trace	nil	
3	3-6-34	nil			Trace	nil	
4	27-6-34	nil			Faint	nil	
5	25-7-34	nil			Trace		
6	5-9-34	nil	0·11%		Trace	nil	
7	24-3-35	1%			nil	nil	
8	20-8-35	3·2%	0·31%	10 units once a day	nil Trace	nil	
9	31-8-35	Trace	0·191%				Improvement under 10 units of insulin a day in 10 days.
10	4-0-36	nil					

N. B.—The urine and blood in most instances were examined by the same pathologist.

It should be treated in the same line as in cases of other complications. In addition we should remember the following special points:

(1) Both P. P. and diabetes are wasting diseases so we must allow a much more liberal diet of high caloric value practically as much as he can digest. An optimum portion of this diet should consist of fat yielding high energy output in a small bulk and containing fat soluble vitamins.

(2) A proportionately big dosage of insulin to utilise the diet—the daily dosage and diet to be split into different parts in the same line as stated above.

(3) So long as the infection of lung is by T. B. alone the reaction of insulin is satisfactory.

(4) With the advent of secondary infection cases become comparatively insulin resistant.

(5) More careful adjustment of insulin and diet is necessary when P. P. patients get surgical treatment specially **A. P.**

IV. Treatment of Diabetes in Children

Here I like to mention a few special points only:

Because of the growing age and relatively greater activity per kilogram of body-weight, the protein requirement, the carbohydrate requirement and total caloric requirements are all greater as compared to adults. Fat requirement is smaller. Proportionate doses of insulin per kilogram is comparatively higher, otherwise treatment should be carried out on the same general principle.

Effect of Oral Administration of Insulin: Though for the sake of efficiency per oral administration of insulin is the route of choice, it is not without its disadvantages. Except in mild cases, the injection is to be repeated once or twice daily probably for years together. Sometimes few thousands of injections will have to be given. A rigid aseptic technique of injection by lay people, is essential to avoid dangers of skin irritation and skin infections. To overcome these disadvantages an effort is all along being made for a successful per oral administration of insulin. In 1930 Dr. H. N. Mukherjee of the Bio-chemical Department of the Carmichael Medical College was first to observe that phospho-tungstate of insulin when given by mouth can lower the blood-sugar.

Later other foreign observers corroborated his observations. In one case of severe diabetes in my ward insulin-phospho-tungstate was administered orally in dosage of 1 oz. twice per day, one hour before meal morning and evening. Blood-sugar was examined every 2 or 3 days and found to be lowered consistently. However big doses had to be used to achieve this end. This case has been reported by Dr. S. M. Ghose in the *Calcutta Medical Journal* in October, 1934. Dr. Mukherjee with his usual zeal and energy is continuing his researches in this line and we hope he will present us with a more efficacious preparation in future.

Disadvantages of Insulin: The chapter on treatment by insulin will remain incomplete unless I mention the disadvantages of its use and their remedies.

Hypoglycæmia—All patients receiving insulin is liable to this risk. Early symptom usually occurs when the blood-sugar falls down to below 0·05%. However considerable variation may occur. In patients who have long been used to high blood sugar, hypoglycæmic symptom may appear when blood sugar is lowered *suddenly* to 0·015% or so. On the other hand in one of my patients—a non-diabetic female with P. P. receiving 1 to 3 units of insulin and 25% 25 to 50 c.c. of glucose daily the blood-sugar was accidentaly found to be reduced from 0·07 to 0·25 without any untoward symptoms.

A case of hypoglycæmia without symptoms in a non-diabetic female with P. P.

Patient P. G., H. F. 25 admitted in C. M. C. H. under me on 25-12-35, for treatment of chronic P. P.

Since a month after her admission in hospital she was having almost regularly I. V. Glucose 25% 25 c.c. With the idea of treating her with glucose and small doses of insulin her fasting blood sugar was examined on 15-2-36 and found to be ·065 p.c. Later course of events are detailed in the next page:

To avoid any chance of error in the percentage of sugar in the blood it was examined on 3 successive occasions and the blood-sugar level was found to be almost the same. The onset of hypoglycæmic symptom varies between 1 to 5 hours after injections depending upon the amount of overdose. Children, delicate women, and patients with vaso-motor disturbances are more liable to hypoglycæmic attack. Exercise increases the action of insulin. Special care should be taken during the period of balancing.

CHART VI

No.	Date	Percentage of Blood-sugar	Glucose I. V.	Insulin	REMARKS
1	15-2-36	0·065%	Started 25% 25 c.c. daily	3 units	4 grams of glucose per unit of Insulin.
2	19-2-36	0·025%	Nil. Stopped to see effect of blood-sugar	nil	Not even slightest symptom of hypoglycæmia.
3	25-2-36	0·031%	25% 25 c.c. started daily	nil	No symptom.
4	28-2-36	0·036%	Continued	nil	Do.
5	10-3-36	0·077%	Do.	Started 1 unit every other day	6½ gram of glucose per unit of Insulin every other day.
6	19-3-36	0·065%	Do.	Stopped	

Treatment of Hypoglycæmia—In early cases immediate oral administration of waterly solution of 1 oz. of glucose or equivalent amount of fruit juice, the patient feels better within 15 minutes to 20 minutes. Patients receiving insulin injections should always keep lumps of sugar at hand. In severe disturbances intravenous injection of glucose 25 c.c., 50 c.c. or more according to the gravity of the cases should be given. Injections of 1 c.c. of pituitrin or adrenalin are also useful.

Other disadvantages—Local allergic phenomena, *e.g.*, urticaria at the site of injections. In such cases different preparations of insulin should be tried until one is found suitable. In highly sensitive cases the patient should be gradually desensitised.

Eosinophilia—Insulin injections over a prolonged period have a tendency to produce eosinophila. In one of my cases it went up from 3 to 16 p.c. to return to normal after injection was discontinued.

Tendency to myocardial depression—Caution should be used in giving insulin in cases of myocardial insufficiency and angina pectoris.

Before closing the chapter of insulin treatment in diabetes I want to point out that there is a large field for insulin treatment in non-diabetics. Acidosis from other causes can be treated with insulin and together with sufficient amount of carbohydrate diet. Small doses of insulin with glucose is one of the best means of supplying regular amount of energy and nourishment to the weak tissues.

B. TREATMENT WITH SUBSTITUTES OF INSULIN

Guanidine preparations are the only substitutes of real practical value. ' Synthalin ' is such preparation. It has a hypoglycæmic effect which is of slower and longer duration than insulin. The mode of action is still uncertain. Its great disadvantages are its toxic manifestations upon digestive tract and liver. To minimise them an allied substance " Synthalin B" is put in the market. Though less toxic, it is not altogether free from its bad effects. It should usually be tried in mild diabetics with low insulin requirements. It should be stopped for a few weeks after a month's course. During its administration the patient should take other medicines to keep digestion and liver in order. The diet is regulated in the same principle as in insulin treatment.

C. TREATMENT BY INSULIN LIKE SUBSTANCES DERIVED FROM VEGETABLES

Substances with properties of reducing blood-sugar when taken by mouth have been isolated from vegetables and has been named " Glycocinin." Investigators like Allen think that the beneficial action of vegetables like cabbage, bean is due to their "glycocinin" content. In our country the *telakuchu* leaves and *blackberries* reputed for their antidiabetic properties probably contain " glycocinin " like substances.

It is supposed that there is an antagonism between external and internal secretion of the pancreas and if the external secretion can be relieved the internal secretion can be improved. With this idea patent preparations of external secretion of pancreas, *e.g.* Trypsogen, Pancrepatine, etc., are widely used. They may have some beneficial effect in mild cases.

D. INTRAVENOUS GLUCOSE TREATMENT IN DIABETES

This method of treatment has been given a fair trial by Dr. B. C. Roy in his ward in the Carmichael Medical College Hospitals. Daily injection of 25% 50 to 150 c.c. of glucose intravenously for weeks

together is given, the diet being also regulated side by side, no insulin being given. By this method blood-sugar has actually been found to be lowered and the general health and weight improved. In the *Calcutta Medical Journal*, December, 1935, Dr. B. C. Roy and Dr. H. N. Mukherjee have conjointly reported this method of treatment with the results in a few cases showing actual all round improvement. They conclude with the following remarks:

(1) There is an intimate relationship between acidosis and diabetes.

(2) The acidosis calls forth liver to empty its glycogen reservoir, the glucose so produced circulates in the system but the tissues are unable to utilise them in absence of insulin.

(3) Insulin in some way affects utilisation of liver sugar (glycogenolysis) by tissues.

(4) As the case reports show, the glucose which was given intravenously was utilised by the tissues and this relieved the liver from the responsibility of uselessly supplying glucose to the tissues.

(5) The same factors which cause exhaustion of the pancreatic cells perhaps also produce acidosis. In *Medical Annual*, 1936, we find reference of this treatment by Rosch and others, they also have noted

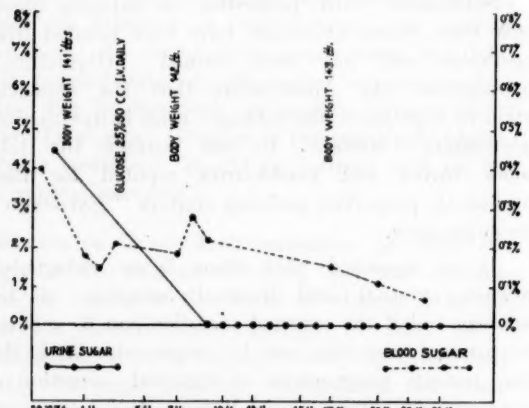


CHART VII—INTRAVENOUS GLUCOSE TREATMENT WITH PROGRESS IN DIABETES MELLITUS

the blood-sugar reducing capacity of glucose given intravenously.

There are so many things to be discussed in this connection that it should really form the subject of a different paper altogether.

It is an undoubted fact that intravenous injection of glucose reduces blood-sugar. Further research should be carried out by others in this line as is being continued by Drs. Roy and Mukherjee.

E. MEDICINAL AND CLIMATIC TREATMENT

Preparations of opium and codeine are distinctly beneficial upon the economy of carbohydrate metabolism. In the pre-insulin days opium and codeine with jambolin were extensively used with advantage. Investigations are now going on in the line of chemotherapy and non-specific protein therapy.

Nervous patients living life of great stress and strain and responsibility in a modern city always improve on a climatic change. This change should preferably be in a colder climate. The relief of nervous strain improves carbohydrate metabolism. In some cases I know from the very date they left Calcutta for a change to Sonthal Pargans or Darjeeling their urinary sugar diminished in spite of the same character of diet. These are mostly mild cases and the improvement is not a permanent one.

F. SURGICAL TREATMENT

In cases of tumour or cyst of the pancreas their removal certainly improves the diabetic condition. Partial ligation of excretory ducts of pancreas in animals succeeded in production of more internal secretion. The procedure is so risky and results are so uncertain that it is not tried in human beings.

G. X-RAY TREATMENT

Some workers tried X-ray exposure on pancreas and adrenals and claim good results while others fail to corroborate them.

My thanks are due to Dr. B. C. Roy and Dr. H. N. Mukherjee for allowing me to refer to their work on "Glucose Treatment in Diabetes" and also Dr. J. C. Saha, M.B., and Dr. S. Bhowmik, M.B., for kindly preparing the charts and figures in this paper.

CIRRHOSIS OF THE LIVER IN NORTHERN CIRCARS (SOUTH INDIA)

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(*Continued from the previous issue*).

PART III

CIRRHOSIS OF THE LIVER FOLLOWING CHRONIC INTOXICATION WITH CARBON TETRACHLORIDE: AN EXPERIMENTAL STUDY.*

This experimental work was undertaken mainly to investigate the evolution and nature of cirrhosis of the liver induced by chronic intoxication with carbon tetrachloride, as it was hoped that such a study would contribute to an understanding of the genesis of fibrosis in human cirrhosis.

Experimental Methods

Depending on the reaction of the experimental animal, subcutaneous injections of 0·1 c.c. to 0·2 c.c. of pure carbon tetrachloride were given once or twice a week for varying periods (*vide* Table). In this experiment, which lasted for nearly 15 months, 21 albino rats, 6 rabbits and 17 guinea-pigs were used. In addition to the subcutaneous injections 3 albino rats were given daily 10 minims of carbon tetrachloride suspended in milk. The drug was administered only by the oral route in all the 6 rabbits and in 2 albino rats.

The animals were kept on a normal laboratory diet (milk, green fodder, germinating gram, etc.).

As the object of the experiment was to induce cirrhosis by repeated, sub-lethal injections, the animals were not killed during the early part of the investigation and the observations on the early changes in the liver were mainly based on a study of the animals which died during this period. The administration of the drug was suspended in some animals which received a number of injections, in order to study the regenerative changes. The liver in all the animals was carefully investigated by the different staining methods mentioned below:—

(1) Ehrlich's acid hæmatoxylin and eosin—for routine staining.

(2) Weigert's iron hæmatoxylin and van Gieson's stain—for staining connective tissue.

(3) Weigert's elastic stain—for staining elastic tissue—counterstained with alum carmine.

(4) Prussian blue reaction (sections were treated with potassium ferrocyanide and hydrochloric acid solutions and counterstained with eosin)—for the presence of iron (to detect the presence of hæmosiderin).

(5) Scharlach R—for staining fat—counterstained with Delafield's hæmatoxylin (frozen sections were used).

(6) Foot and Menard's (1927) silver carbonate impregnation method—for staining the reticulum (frozen sections were used).

Observations

General. Guinea-pigs were found to be very susceptible to the drug, as they generally died after the first or the first few injections, and no animal in this series survived to receive more than 10 injections. The albino rats which received repeated injections gradually became wasted, lost their hair and died. There was no appreciable change in the general condition of the rabbits which received the drug only by mouth.

Sloughing and ulceration at the site of the injection were occasionally observed.

Autopsy findings. I. The liver.—(a) In one instance in which the animal (No. 12) died immediately after the injection, the liver showed marked congestion of the hepatic and portal venous trees, but the parenchyma showed no noticeable changes.

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(b) In animals which died 12 to 72 hours after one injection (8 in this series), the liver was markedly congested and the surface showed a slightly trabeculated appearance (Gardner *et al.*, 1925) due to alternating red and slightly yellowish areas.

Microscopically, there was marked engorgement of the hepatic and portal venous trunks.

In one animal (No. 6) which died 12 hours after the injection, the hepatic cords around the central veins were swollen and contained small or big fat vacuoles; their nuclei were pyknotic. The hepatic cords around the portal spaces were normal but those in the middle zone showed slight fatty degeneration. In preparations especially stained by the Foot and Menard's silver impregnation technique, the reticulum of the liver (in this case) was found to be intact.

The liver showed marked necrosis of the parenchyma around the hepatic terminals (involving half to two-thirds of the so-called lobules) in both the instances in which the animal survived 24 hours after the injection (Figure 24). The central veins were generally destroyed and, if evident, showed a desquamation or a rupture of their endothelial lining. The sinusoids were congested and the necrotic central zone was invaded by Kupffer cells, polymorphonuclear leucocytes and mononuclear phagocytes. The middle and occasionally the peri-portal zones showed fatty degeneration of the hepatic cords. The liver showed more or less similar changes in the animals which survived two (2 animals) or three days (3 animals), but the phagocytosis was more marked (Figure 25). In all these instances the peri-sinusoidal reticular frame work around the hepatic terminals was still intact.

(c) Animals which received 2 to 6 injections (10 animals) showed changes in the liver similar to those described above. The granular debris of the coagulated protoplasm around the central veins, which were faintly staining, was invaded by a large number of Kupffer cells and mononuclear phagocytes. The hepatic cords in the middle zone showed vacuoles of fat in their protoplasm, while those around the portal spaces showed granular protoplasm. Evidences of regeneration were not noticed. In some instances, the granular debris was cleared off by the phagocytes and the necrosis was limited to a small area around the central vein. Occasionally the necrosis was more marked; with the exception of small islands of hepatic cords, which showed fine vacuolation with fat, around the portal spaces, the entire parenchymal mantle showed necrotic changes.

The central veins were usually not discernible, but, in one instance, the endothelium of the central veins showed desquamation into the lumen.

The peri-sinusoidal capillary reticulum around the central veins showed disorganization.

(d) The appearances of the liver in the albino rats and guinea-pigs which received 6 to 10 injections (3 animals) varied considerably. In the latter, the appearances of the liver were similar to those described above: but, in the former, the liver was atrophic, the surface was slightly irregular and on microscopic examination showed scarring around the central veins (Figure 26), which were dilated and congested. The scars were not compact and dense; often they contained large pigmented mononuclear cells. The sinusoids around the scarred areas were congested; the hepatic cords around the portal vein were hypertrophic and showed evidences of regeneration.

(e) Though the connective tissue was not proportional to the number of injections, animals which received 10 to 30 injections (3 animals) showed well-marked fibrosis around the central veins. The hepatic parenchyma showed no loss of pattern. There was slight increase of peri-portal connective tissue.

(f) Of the seven animals which received 30 to 49 injections, three showed a finely granular liver, while in four instances the surface of the organ showed a hobnail roughness (Figures 22 and 23).

Microscopically, the liver in the former group showed only irregular loose stellate areas of fibrosis (Figure 27), often containing pigmented mononuclear phagocytes, and either no loss of the parenchymal pattern, or only slight tendency to pseudo-lobulation. In the latter group, the capsule of the organ was slightly thickened and finely irregular; from the wedge-shaped areas of fibrous depressions proceeded loose fibrous tissue bands, which were continuous with the connective tissue network which divided the parenchymal mantle into numerous, rounded islands of varying sizes (Figures 28 and 29); the connective tissue network was loose and cellular but had undergone collagenous change (Figure 29) and radiated mainly from the sclerosed hepatic veins; in its wider nodes, the connective tissue-network also enclosed the portal

FIG. 22.

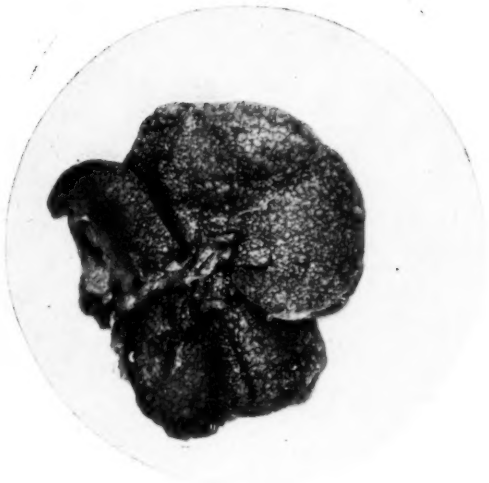
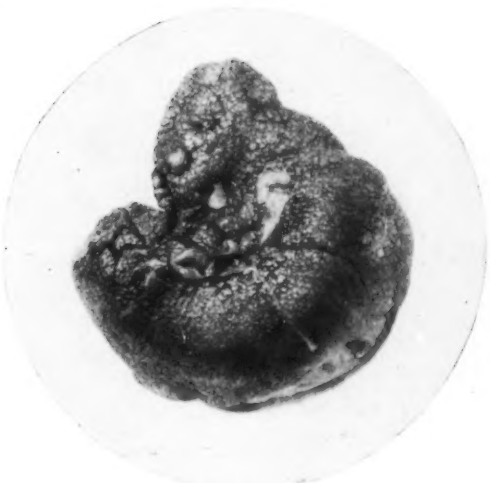


FIG. 23.



FIGS. 22 and 23.—White rat No. 11. $\frac{\text{48 injections and 10 m. orally for 168 days.}}{\text{277 days.}}$

Photographs of the liver showing hobnail roughness of the surface.

FIG. 24.

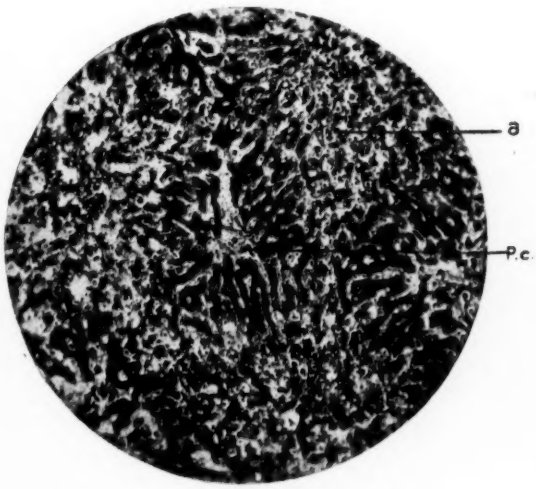


FIG. 24.—Guinea-pig No. 21. $\frac{\text{1 injection.}}{\text{1 day.}}$

Photomicrograph of a section of the liver showing the necrosis of the parenchyma (a) around the hepatic terminals. p.c.—portal space.
(Ehrlich's acid hæmatoxylin and eosin; apochromat objective—8 mm.; periplan. o. k. eye-piece —4 mm.—Leitz.).

FIG. 25.

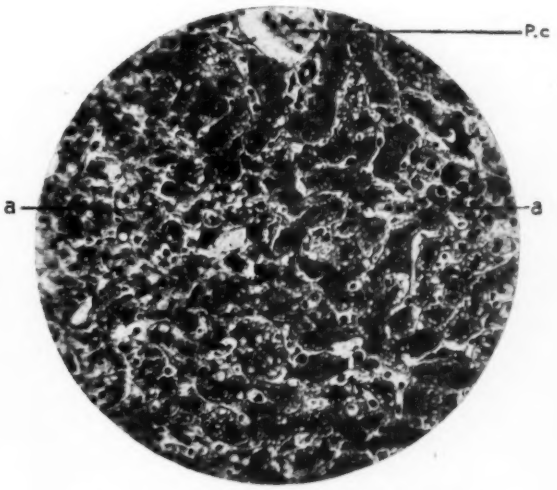


FIG. 25.—Guinea-pig No. 20. $\frac{\text{1 injection.}}{\text{3 days.}}$

Photomicrograph of a section of the liver showing invasion of the necrotic zone (a) by mononuclear phagocytes and Kupffer cells. p.c.—portal space.
(Ehrlich's acid hæmatoxylin and eosin; apochromat objective—4 mm.; periplan. o. k. eye-piece —4 mm.—Leitz.).

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FIG. 26.

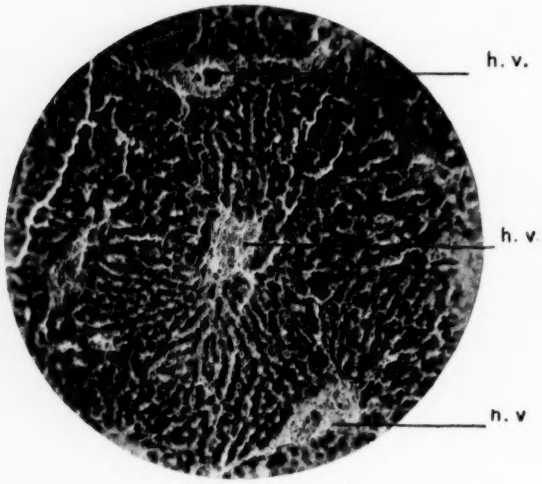

FIG. 26.—White rat No. 26. $\frac{7 \text{ injections.}}{47 \text{ days.}}$

Photomicrograph of a section of the liver showing scarring around the central veins (h.v.).

(Ehrlich's acid hæmatoxylin and eosin; apochromat objective—8 mm.; periplan. o. k. eye-piece —4 mm.—Leitz.).

FIG. 27.

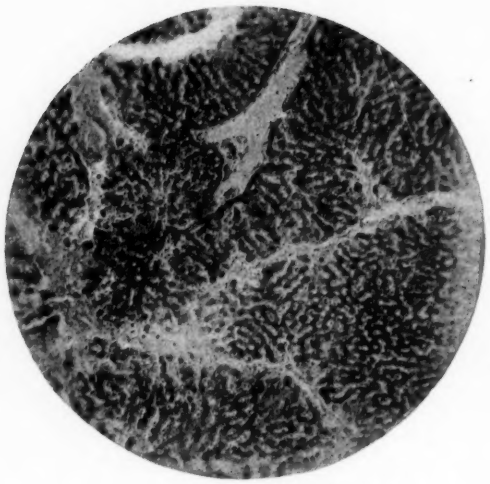

FIG. 27.—White rat No. 5. $\frac{33 \text{ injections.}}{166 \text{ days.}}$

Photomicrograph of a section of the liver showing irregular, loose, stellate areas of fibrosis containing pigmented mononuclear phagocytes around the central veins, and a tendency to pseudolobulation.

(Ehrlich's acid hæmatoxylin and eosin; apochromat objective—8 mm.; periplan. o. k. eye-piece —4 mm.—Leitz.).

FIG. 28.

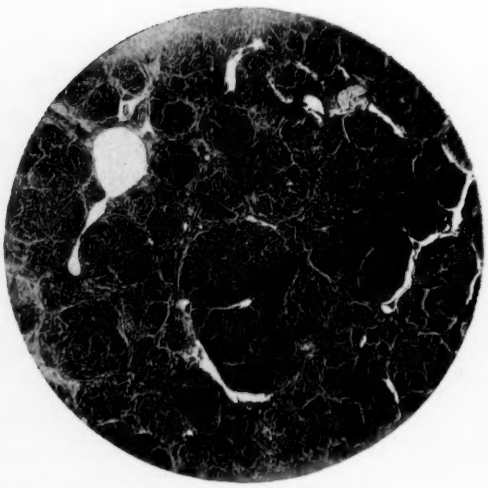

FIG. 28.—White rat No. 11.

$\frac{48 \text{ injections and 10 m. orally for 168 days.}}{277 \text{ days.}}$

Photomicrograph of a section of the liver in Fig. 22 showing the bands of loose fibrous tissue dividing the parenchymal mantle into numerous, rounded islands of varying sizes.

(Ehrlich's acid hæmatoxylin and eosin; objective —22 mm., Beck; periplan. o. k. eye-piece—4 mm. —Leitz.).

FIG. 29.

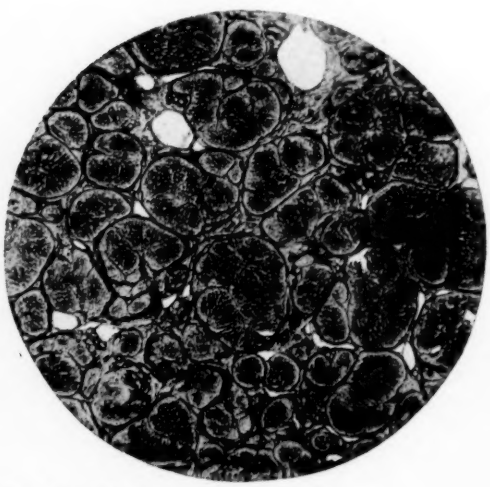

FIG. 29.—White rat No. 11.

Low power photomicrograph of the reticulum of a section of the liver in Fig. 22 showing the well-marked pseudolobulation and a deficient reticulum in the pseudo-lobules. The parenchyma in this section is stained by oxalic acid.

(Foot and Menard's silver carbonate impregnation technique; objective—22 mm., Beck; periplan. o. k. eye-piece—4 mm.—Leitz.).

spaces. The presence of pseudo-bile canaliculi in the connective network was not a marked feature. The pseudo-lobulation was well marked; the pseudo-lobules occasionally showed sclerosed and eccentric hepatic veins; the hepatic cords in the pseudo-lobules were hypertrophic and occasionally showed fatty degeneration. Pigmented mononuclear phagocytes were found around the hepatic veins and occasionally around the portal spaces, in the connective tissue-network. Silver impregnation of the reticulum showed a collagenous, loose, connective tissue-network, well-marked pseudo-lobulation, a scarcity of the hepatic terminals and sclerosis of the bigger divisions of the hepatic venous tree (Figure 29); the reticulum in the pseudo-lobules was deficient) Figure 29). The portal venous tree showed no remarkable changes, beyond congestion. The Kupffer cells showed fine, granular, brownish pigment in them.

The hobnail appearance of the liver was more marked in the animals (Nos. 10, 11 and 36) which received the drug also orally, for varying periods, in addition to the subcutaneous injections.

(g) The appearances, macroscopic and microscopic, of the liver in the animals (6 rabbits and 2 albino rats) which received the drug only by mouth. were similar to those seen in animals which received 2 to 6 injections subcutaneously [*vide* (c) above].

II. The spleen.—The spleen in all the instances showed marked congestion and hæmosiderosis. Reticulo-endothelial hyperplasia was occasionally seen.

III. Other organs.—The *lungs* showed sub-pleural hæmorrhages and marked congestion. Catarrhal or suppurative bronchitis, bronchiolitis, peri-bronchial fibrosis or broncho-pneumonia were occasionally found. The *kidneys* showed congestion and occasionally moderate cloudy swelling of the convoluted tubular epithelium.

Sub-serous hæmorrhages were commonly seen. The *other organs* generally showed engorgement.

Discussion

Attempts at inducing hepatic cirrhosis in experimental animals by repeated administration of small doses of carbon tetrachloride have been productive of encouraging results. A review of the subject is found in a paper by Moon (1934); central fibrosis of the liver without loss of lobular pattern, following carbon tetrachloride poisoning, was reported by Gardner and his associates (*loc. cit.*); cirrhosis of the liver with pseudo-lobulation was reported by Midorikawa (1925), Lamson and Wing (1926), Albot (1931) and others, but the type of cirrhosis was not emphasized; van der Schueren (1932), Bollman and Mann (1931), Lacquet (1932), and others described the hepatic cirrhosis induced by chronic intoxication with carbon tetrachloride as having the characteristics of Lænnec's or atrophic cirrhosis. On the other hand, Ramachandra Rao (1933) has emphasized that the distribution of fibrosis, in the hepatic cirrhosis induced by carbon tetrachloride intoxication, is mainly around the hepatic venous tree (unlike that seen in portal cirrhosis), and resembles that seen in toxic cirrhosis.

The significant findings in all the four instances, in this series, in which the liver showed hobnail roughness and marked cirrhosis were, as pointed out already, sclerosis of the bigger divisions of the hepatic venous tree, a loose, cellular fibrous tissue-network, mainly around the hepatic venous tree, and marked pseudo-lobulation. These appearances are very much similar to those described in toxic cirrhosis (Radhakrishna Rao, 1935a, Chapter III, Part I).

Lacquet (*loc. cit.*) considered that the cirrhosis produced by carbon tetrachloride cannot be caused by necrosis of the hepatic parenchyma, as the fibrosis after repeated administration of the drug did not depend on the extent of the necrotic lesions of the parenchyma; repeated poisoning was said to exhaust the regenerating power of the liver and stimulate the mesenchyma to more active proliferation. But in preparations especially stained to show the reticulum of the liver by the silver impregnation method (Foot and Menard, *loc cit.*), the genesis of fibrosis in the cirrhosis induced by carbon tetrachloride poisoning could be traced to a disorganization, collapse, condensation and sclerosis of the reticulum of the sinusoidal capillary bed around the hepatic terminals consequent on the necrosis of the parenchyma in the same area; moreover, the looseness of the fibrous tissue and the absence of any inflammatory reaction at any stage of its development suggest that the cirrhosis, following chronic intoxication with carbon tetrachloride, is of the nature of a replacement fibrosis. As pointed out already, the appearances in the liver are very suggestive of a toxic cirrhosis.

The peri-central necrotic lesions in the early stages, in the animals in the present series, are

Table Showing Details of the Course of the Experiment.

Serial number.	Experimental animal.	Carbon Tetrachloride.		Number of days of experiment.	REMARKS.
		Subcutaneous injections.	Oral administration (m. = minims).		
1	Albino rat ...	...	...	193	Control—died after 193 days.
2	,, ...	...	...	105	Control—died after 105 days.
3	,, ...	46	...	241	Liver—early cirrhosis.
4	,, ...	45	...	228	Liver—marked cirrhosis.
5	,, ...	33	...	166	Liver—early cirrhosis.
6	,, ...	1	...	12 hours	Died 12 hours after injection.
7	,, ...	24	...	132	...
8	,, ...	12	...	72	...
9	,, ...	48	...	259	Liver—early cirrhosis.
10	,, ...	49	10 m. daily for 146 days.	447	Liver—marked cirrhosis.
11	,, ...	48	10 m. daily for 168 days.	277	Liver—marked cirrhosis.
12	,, ...	1	...	...	Died immediately after injection.
13	Guinea-pig ...	7	...	36	...
14	,, ...	5	...	21	...
15	,, ...	1	...	2	...
16	,, ...	10	...	59	...
17	,, ...	5	...	25	...
18	,, ...	1	...	3	...
19	,, ...	5	...	22	...
20	,, ...	1	...	3	...
21	,, ...	1	...	1	...
22	,, ...	1	...	1	...
23	,, ...	...	...	...	Control.
24	,, ...	...	...	...	Control.
25	Albino rat ...	16	...	108	...
26	,, ...	7	...	47	...
27	Guinea-pig ...	4	...	23	...
28	,, ...	4	...	21	...
29	,, ...	3	...	15	...
30	,, ...	2	...	11	...
31	,, ...	2	...	10	...
32	Albino rat ...	1	...	2	...
33	,, ...	1	...	3	...
34	,, ...	2	...	8	...
35	,, ...	2	...	8	...
36	,, ...	42	10 m. daily for 91 days.	265	Liver—marked cirrhosis.
37	Rabbit ...	...	10 m. daily	30	...
38	,, ...	...	,,	,,	...
39	,, ...	...	,,	,,	...
40	,, ...	...	,,	,,	...
41	,, ...	...	,,	,,	...
42	,, ...	...	,,	,,	...
43	Albino rat ...	...	,,	,,	...
44	,, ...	...	,,	,,	...

similar to those described, both in experimental animals (Lacquet, *loc. cit.;* Ramachandra Rao, *loc. cit.;* Gardner and his associates, *loc. cit.;* etc.) and in human cases (Keher and Onendal, quoted by McGuire, 1932) after carbon tetrachloride poisoning. But unlike the human cases (McGuire), the kidney changes in the present series of animals were not marked.

The intense engorgement of the viscera after the administration of carbon tetrachloride no doubt suggests that the drug has an action on the vascular system. But it is difficult to explain the peri-central distribution of the necrotic lesions in the hepatic parenchyma. This peculiar zonal distribution of the parenchymal lesions has been attributed (Ramachandra Rao, *loc. cit.*) to a vasoconstriction and spasm of the sinusoidal capillaries of the hepatic venous end, due to an imbalance of the vasomotor mechanism of the liver. But the sinusoidal capillary congestion in the liver, following the administration of carbon tetrachloride in the present series of animals, was more or less uniform throughout the lobule and evidences of vasoconstriction in the central zones were not particularly striking. A direct hepato-toxic action of the drug, however, appears improbable on account of the peri-central distribution of the necrotic lesions in the hepatic parenchyma.

A deficiency of the reticulum in the liver of the albino rat, unlike that seen in the human liver, probably explains its deficiency also in the pseudo-lobules in the cirrhotic livers of some of the animals of this series. In the albino rat, the reticular tissue is mainly found around the portal and hepatic venous trees, while the peri-sinusoidal reticulum, especially in the middle zones, is scanty.

The absence of pseudo-bile canaliculi, both in the cirrhotic and non-cirrhotic livers in this series in which regenerative changes were marked, is additional evidence that these structures do not take part in the regeneration of hepatic tissue (Radhakrishna Rao, 1935b, Appendix 8, p. 27).

The results of this experimental study suggest that the sub-acute toxic necrosis and cirrhosis observed in the livers of children suffering from the so-called *'infantile biliary cirrhosis'* (Radhakrishna Rao, 1934; 1935b; 1935a, Chapter III, Part I) are similar to those seen in the experimental animal and are due to the slow, persistent and sub-acute action of a toxin; the exact nature of the toxin, however, is not clear from this study.

Summary

Repeated administration of small doses (0·1 c.c. to 0·2 c.c. once or twice weekly) of carbon tetrachloride subcutaneously to albino rats produced toxic cirrhosis. The fibrous tissue was mainly distributed around the hepatic venous tree, which showed sclerotic changes in its larger divisions; its genesis in the cirrhosis thereby induced was traced to a disorganization, collapse, condensation and sclerosis of the peri-sinusoidal reticulum around the hepatic terminals, consequent on a necrosis of the parenchyma in the same area.

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GAS WARFARE

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To write on a subject that is not likely to appear among the papers of the Conference and indeed may well be criticized as one without practical importance or even interest to Indian medical men is certainly a decision to be met with strong opposition. It is an almost justifiable criticism and yet not wholly so. Soviet Russia, for example, is not so far from the Punjab that what is feared in all parts of England on the outbreak of war could not happen to that great province. It refers to attacks, specially upon towns and cities of hostile aeroplanes carrying gas bombs.

The danger is so possible in England and other European countries that they are all organising for defence of their citizens against gas attack and in this organisation the medical men are already taking their part. It will not be quite useless to medical men in India if they are acquainted with certain salient features of gas warfare, *viz.*, the various gases used, the deleterious effects of these gases produced in the system, the ways and means of protecting oneself against such onslaughts and the treatment of gas-infected casualties.

When such a gas attack takes place the medical practitioners and members of hospital staffs will have to deal with three groups of cases, *viz.*, (1) those infected by gas but not otherwise injured, (2) those injured by high explosive bombs and also gas—some explosive shells indeed carry gas and (3) those already with the consequences of gas. The second class of cases, however, is not dealt with in this paper.

What the Government in England is doing about the medical practitioner can be best realised when the scheme adopted by it (*vide B. M. J.*, Oct. 16, 1936) is gone through. The scheme has just been begun and that on a small scale. Certain medical men have been sent to a special training school near Bristol and ten of them have been sent to lecture to the practitioners. It is arranged in the following way. The doctors of a 20 mile area are asked to attend a demonstration for six days each week, lasting for 2 hours in the evening the hours being chosen to suit the doctors. The Government is issuing also a book " Treatment of gas casualties, a hand book for hospitals, doctors and nurses."

The teachers are equipped with the necessary apparatus by Government, though the poison gases themselves are mercifully left to the imagination. The apparatus is conveyed to the place of demonstration by motor car.

The principal part of the apparatus is that which protects the lungs against irritating poison gases and that which protects the skin as a whole against mustard gas, and the chief value of the demonstrations is, after a description of the effect of the gases, in the actual application of the apparatus. The doctors have themselves to learn how to fit a respirator, to see that it does fit and so on.

The gases given in Handbook No. II of Air Raid Precautions issued by the Government and entitled " Anti-gas Precautions and First Aid for Air Raid Casualties " are grouped as *choking gases, nose gases, tear gases, and blistering gases.*

The *choking gases* are chlorine, phosgene, the chemical formula of which is $COCl_2$. There is one that stands between these two gases and which was freely used, usually in combination with other gases, namely chlorpicrin, the formula of which is CCl_3NO_2. From the knowledge of chemistry, is understood the relation of both phosgene (which has nothing to do with phosphorus) and chlorpicrin to chloroform, as the three formulas show, namely, $CHCl_3$, $COCl_2$, CNO_2Cl_3. Chlorpicrin is also named nitrochloroform. The two gases, phosgene and chlorpicrin, might be called irritating forms of chloroform, which are so irritating that they are not anæsthetic.

The effect of these gases depends upon their solubility. Chlorine is the most soluble and therefore it dissolves in the nasal and throat passages, and rapidly causes a burning sensation of the eyes, nose and throat. It then passes into the bronchi and so damages the protective mucous membrane of

these air tubes that they become readily pervious to microbes, and the same sort of action occurs as occurs when the epithelium of the skin is rubbed or scorched off. There is oozing and excretion of mucus and even blood, in short, there is an intense irritating bronchitis. The pneumococcus now gets its opportunity and pneumonia supervenes. So death may occur some days after the inhalation of the chlorine. If the vapour is very concentrated, death may occur at the time of inhalation. The patient is actually choked by the violent congestion of the air passages.

Chlorpicrin is the middle gas in solubility and the middle in its effects. It is not so irritating to the nose and trachea, and when it reaches the bronchus and lungs it also acts more slowly. It has, however, one advantage over chlorine and phosgene. It penetrates masks more rapidly and causes nausea and vomiting which necessitates the removal of the mask, and which of course exposes its possessor to further dangerous vapour.

Phosgene was the most lethal of the war gases used in the Great War, but owing to its poor solubility its action is very slow. Except for a smell rather like nasty hay and some coughing, and irritation of the eyes, there is nothing very alarming about it, unless highly concentrated, at the outset. But it settles right into the smallest air passages and the air cells themselves and there in the most essential part of the lungs it works its deadly harm. So it may be some hours before any discomfort is felt. Then ensues a gradually increasing œdema of the air cells of the lungs and a slow process of drowning from the increasing fluid which prevents the oxygen of the air reaching the capillaries of the lung, the escape of CO_2 from the venous blood, and blocks the capillaries themselves.

Such are the three choking gases. The treatment is on general medical lines, and in the case of phosgene especially, absolute rest for fear of failure of the heart. I need not describe the treatment, indeed as yet the treatment recommended by the Government has, as I have said, not been published. In the past it was primarily preventive by the use of the respirator, and in actual infection treated by rest, oxygen, venesection, and intravenous saline, according to indications and experience.

The next class of gases are the *nose gases*, gases that cause intense irritation and pain in the nose with excessive sneezing. These are compounds of arsenic. Their effect is temporary, without permanent injury, but should they be inhaled, they cause such severe sneezing that the mask cannot be put on. They were, therefore, combined with the dangerous gases during the War. The present respirator has a filter made of celluloid or similar substance, which filters off the smokes of arsenical gases and prevents them reaching the nose and mouth of the wearer.

Tear gases, which blind the person attacked by a stream of tears due to intense irritation of the eyes, have much the same use as the nose gases. They render those attacked helpless and the effect may last some hours, but they are not dangerous to life.

The last of the gases are the *blister gases*, of which the principal one is mustard gas, or dichlorethylsulphide with the formula $(C_2H_4Cl)_2S$. It was by far the most effective military gas of the War, and it is said that during ten days in the autumn of 1917, some million shells were fired containing 2,500 tons of mustard gas. So important did it become that the fate of the War seemed likely to depend at one time as to whether the German or the Allies' chemists were the most efficient in its production.

Dichlorethylsulphide is a colourless, oily liquid, which has a faint mustard smell, which led to its being called mustard gas by the tommies. It has, of course, nothing to do with mustard. It is only very slightly soluble in water and it evaporates slowly. Hence it is notably persistent. In cold weather it will go on giving off its dangerous vapour for a month or longer.

It is highly poisonous. It causes irritation of the eyes which eventually are closed with oozing of free pus and causes an acute purulent conjunctivitis which may destroy the cornea and lead to permanent blindness. It irritates the lungs and causes bronchitis and pneumonia which may prove fatal. It passes through any clothing, except the specially contrived protective clothing and blisters the skin, resulting in ulcers which take a very long time to heal. It, therefore, will put men out of action for a prolonged period. Moreover, as it has only a faint smell and is invisible and is slow in its effects, it may implant itself before the need of wearing the respirator or cleansing of the clothing is realized.

It is really remarkable how dangerous this substance is. If the ground that has been contaminated

by a spray of splashes of this oily liquid is walked over, it will penetrate leather boots and cause severe bruise. Moreover the gas given off from the boots will attack the wearer's eyes and lungs and those of other persons, if he enters a room where they are assembled. Touching anything splashed by the liquid from a bomb or sprayed from an aeroplane, will cause severe burns, if it is not quickly removed. As its smell is so slight and may be confused with other smells, it is clear that after a bombardment or the spraying of a town by aeroplanes, the danger of getting attacked by the gas or liquid to those citizens who have to move about is very great.

It is against this danger that the greater part of the precautions taken by various governments are directed. Mustard gas and its oil, used in the Great War, seem still to be the most formidable representative of the war gases. Possibly it has been rendered yet more dangerous. If so this information has not been given, as far as I know, to the public of any nation. Its combination with tear gases and nose gases used in the War for the purpose of disabling people attacked from quickly adopting the means of defence.

These means themselves are important to doctors, who are called upon to treat gas infected casualties. The doctor must be himself protected, otherwise he will inevitably become a casualty. The first protection is the respirator. This is a mask with valves for the intake of air and the escape of expired air, with a container, in which is activated charcoal and a filter of celluloid, through which the outer air has to pass before it reaches the lungs. The charcoal absorbs mustard gas, phosgene, and others, the filter stops the smoke of arsenical gases. Medical men are to learn practically how to select and fit the masks upon the differing shapes of people's faces and see that there is neither leak nor undue pressure. First-aid workers, members of decontaminating brigades, nurses, ambulance brigades, and members of the services should also have this practical knowledge.

After the respirator comes protective clothing, which is only very slowly penetrated by mustard gas and consists of jacket, trousers, hood, gloves of oil skin and rubber boots. The use of these also has to be learnt. The wearing of them causes perspiration and exhaustion and men cannot work for much more than an hour or two when wearing them. But without them the gas and liquid will inevitably cause a casualty. Similarly if infected the clothes have to be removed by some one in the appropriate protective clothing. The injured man or infected man has to have his clothing removed as quickly as possible and then be placed under a shower for several minutes so as to wash as much of the stuff away as possible. Further one reels in chlorinated vaseline, wherever there is a suspicion of the skin being infected. Above all and first of all, the eyes require frequent bathing with warm water.

Everything that has been infected has to be decontaminated by covering with chlorinated lime and sand, or creams made of the chlorinated lime and water, or pastes of the same plastered on to a wall and covered with paper and left, or oil rags for metal. This however is not the work of the medical man but of the decontamination brigade, but he should know how it is done. His concern is to protect himself, assist at the decontamination of his patient, and then treat him.

There is only one favourable note in this rather horrible business. It is this that permanent disablement from mustard gas, even of the eyes, is rare. The excessive winking caused is a protection.

The death rate of the Americans in the War from mustard gas was probably less than 1%. It causes abundant casualties, but it has not the maiming cruelty of high explosive shells.

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ENDOCRINE REGULATION OF CARBOHYDRATE METABOLISM IN NORMAL AND DIABETIC STATES

The epoch-making discovery of insulin has not only conferred a great boon on diabetics, but has also advanced our knowledge considerably about carbohydrate metabolism. The liver is the most important organ or site where continuous production of sugar takes place and muscles are the tissues which consume it largely. During exercise and times of stress and strain, more sugar is consumed; hence it becomes necessary to have a storehouse of sugar in the body. Liver again (to a less extent skeletal and cardiac muscles as well) serves as a store for this emergency sugar, which is retained in the shape of glycogen. There is a remarkable constancy in the fasting level of the blood sugar and if there be any temporary rise in the level of blood sugar (as after a heavy carbohydrate meal or after an injection of glucose), the blood sugar equilibrium is re-established within a fairly short period of time. In temporary starvation again, this level is maintained more or less, by transformation of glycogen into glucose. All these facts imply that there is a controlling or regulating mechanism for storage, supply and consumption of glucose. Various endocrine glands—pancreas on the one hand and pituitary, adrenals and thyroid on the other—are concerned in this regulation. Secretion of insulin is a continuous process, though its amount may vary somewhat according to the need of the body. Insulin permits the liver to form and store hepatic glycogen, allows normal production as well as consumption of sugar and acclerates resynthesis and storage of muscle glycogen also. It brings down the blood-sugar level both by storage and consumption, if for any reason the level is raised. Hyperglycæmia stimulates the islet cells to increased production of insulin and in hypoglycæmia secretion of insulin is decreased. Thus there is a reciprocal inverse relationship between hyperglycæmia and the endocrine activity of the pancreas. Houssay and his collaborators have, in 1929, conclusively demonstrated the diabetogenic or " contrainsular " function of the anterior lobe (to a less extent of neuro-intermediate lobe) of the pituitary. Presence of excess of anterior pituitary extract prevents hypoglycæmia, tends to raise the level of blood-sugar and increases pre-existing diabetes in a depancreatised dog. It markedly increases the resistance to insulin. It may even bring about total exhaustion of the pancreas. The " contra-insular " hormone is supposed to be secreted into the cerebro-spinal fluid, and through it acts directly on the sugar-centres of the brain stem. These centres, in their turn, activate the adrenals through the sympathetics. This theory of sympathetic transmission is supported by the fact that the action of the anterior pituitary secretion can be interrupted by mechanical inhibition of the sympathetics (by section of sympathetics). Stimulation of sympathico-adrenal mechanism brings about glycogenolysis (*i.e.* setting free of sugar from glycogen). When the glycogen storage is depleted, hypoglycæmia becomes profound. Intravenous supply of sugar alone can ameliorate this hypoglycæmia. In Addison's disease, in atrophy or destruction and denervation of the adrenals or after section of the splanchnic nerves, there is a marked susceptibility to

insulin-shock. Thus, the adrenal system is also antagonistic to the endocrine function of the pancreas. Similarly, though to a less extent, thyroid also is antagonistic to the islet cells of the pancreas. The liver stands on a different footing. As has been said, it is the site for continuous production of sugar and is the store-house of glycogen. Removal of the liver brings out marked and rapid hypoglycæmia (Mann). It seems to be established that the liver is absolutely necessary for production and maintenance of the diabetogenic action of the anterior pituitary but its presence is not necessary for hypoglycæmic function of insulin. There has been a considerable amount of controversy about the mechanism by which the normal level of blood-sugar is maintained or regulated—whether it is humoral (that is through the blood) or nervous. Balance of evidence seems to prove that the humoral factor is much more predominant and important and the nervous factor, though it exists, is only accessory and is of secondary importance. Denervation of the liver, pancreas, adrenals, or thyroid, does not alter the level of blood sugar to any appreciable extent. The nervous factor can even be dispensed with. The central nervous system is unnecessary for normal secretion of insulin; it comes into play only when the blood sugar level is abnormal.

* * * *

Dosage of insulin varies with body-weight, temperature of the body, presence of sepsis, degree of hyperglycæmia, and the amount of food consumed. The dose of insulin has to be adjusted to meals. On account of its short period of activity hypoglycæmic reactions are likely to occur. Prof. Hagedorn of Copenhagen prepared a compound of insulin and a protamine obtained from fish sperm. After injection it is absorbed slowly, hence its action is more prolonged and thereby the danger from hypoglycæmic reaction is lessened. The name given to it is " Insulin retard." The latest preparation is the protamine zinc insulin. Addition of zinc has increased the stability as well as the buffer action. With this preparation often one daily dose suffices, diet can be adjusted to insulin, instead of insulin being adjusted to diet as with the pure insulin. Hospitalisation of patients becomes unnecessary, hypoglycæmic reactions are less frequent and less severe with this new insulin.

MODERN THERAPY IN GENERAL PRACTICE

THE TREATMENT OF ENLARGED PROSTATE BY INJECTION

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Dewas (Senior), Central India.

This treatment of prostatic enlargement is devised to meet conditions in India occurring in old men, most of whom come for treatment after a serious state of affairs has developed owing to their advanced deterioration in general health and the distension of the bladder by retention of urine and by cystitis. Some may have been catheterised, others come with acute retention. Without putting them to the urea concentration test it is seen at a glance that these cases are quite unfit for prostatectomy. The better class also will not consent to an operation and will rather accept a catheter life, while others are too ignorant to know that something can be done to relieve their condition.

The treatment here described is applicable to all class of cases, chronic, fibroid, the adenomas of the prostate and the prostatic bar; to the carcinomata it is, of course, not applicable, though I believe, a course of injections with the acids I recommend places malignant growths such as that of the prostate, uterus, tonsil, and pharynx in a more favourable condition for treatment by radiums.

To surgeons in England I do not think the injection treatment will recommend itself, owing to the fact that cases come earlier there, and that an efficient prostatectomy is at their disposal. However, I have seen that statistics show that only 40% of prostatic trouble are fit for prostatectomy and I presume that excludes the prostatic bar. Now, what becomes of the 60% that are not fit for operation, they go on, one imagines, to a catheter existence or bladder drainage. It is to this remainder that I advocate a trial by injection. I find that nowadays I am more successful in my cases than when I began 4 years ago which I take it to be increased skill by practice and a greater experience of the solutions to be used.

Further I would advocate the injection treatment trial in early cases, if these can be found, and they are not easy to obtain, as patients come only when serious disability has directed their attentions to their bladders then only do they consult a surgeon, before that they were unaware of any such thing as a prostatic enlargement. If an adenoma of the prostate has grown to a large size, we would all urge its removal by prostatectomy; but these cases are not numerous. The way to obtain early cases is to ask every likely subject whether he comes for bladder trouble or not. How many times he has to get up at night to pass urine, and if it be twice and over, then examine his prostate per rectum, and a diagnosis of prostatic enlargement is often made. He is then a favourable case for prostatic injections. Thus the treatment I advocate is suitable for all classes of prostatic disease with the reservations already made concerning malignant growths.

The position at the present time is:—if the patient be unfit for prostatectomy and the great majority are in India, that we have little else to offer them except the catheter, when this becomes too painful, or cystitis is produced the condition of affairs is pretty desperate; now I say, inject the prostate: if you put yourself in the position of gaining the simple skill required, you have an excellent means of giving your patient relief, and that too permanently.

THE TECHNIQUE

Instruments—One Record Syringe of 5 c.cm.; one set of 3 lumbar puncture needles, Krupp's steel V2A, fitting the above syringe.

The largest of the set is the one I prefer, as it is stiff—a flexible needle is quite unsuitable. It is a formidable looking weapon and requires to be kept sharp: if the operator is able to do this himself it is all the better, as a blunt and large needle is destructive in so long and deep a penetration.

SOLUTION No. 1.

Acid Carbolic—half dram.
Glycerine—one dram.
Planocaine or Novocaine—16 grains.
Aq. distillata—four ounces.

Solution No. 2.

Acid Citric—half dram.
Acid acetic glacialis—half dram.
Acid carbolic—half dram.
Glycerine—one dram.
Planocaine or Novocaine—16 grains.
Aq. distillata—four ounces.

In both cases add the planocaine after the acids have been dissolved in the water, as contact with strong acid destroys the effect of the planocaine or novocaine. Keep solutions for 24 hours before use in order to self-sterilise them.

Preparation of the Patient

(1) It is as a rule unnecessary to give an enema, as the rectum is usually empty but if found full, then irrigation is done. (2) The skin of the perineum, while the patient lies on his left side across the table with knees drawn up is now sterilised by swabs of petrol, and when clean is dried off and painted with iodine or picric acid; drying off is essential lest the skin becomes irritated.

(3) A 5 c.cm. Record Syringe with a 2 inch needle is prepared with 3 c.cm. of Novocaine or Planocaine solution 2%, and this is injected about an inch or an inch and a half under the skin in front of rectum some solution is injected, then the needle is made to penetrate deeply and more solution injected deeply into the perineum. A beginner should insert the left finger into the rectum and its anterior bay in order to let him feel what he is doing and not penetrate the rectum. After 15 minutes the injection of the prostate can be done, when the novocaine will have acted.

Position of the Patient

Either in the lithotomy position, which I would advise a beginner to use, or preferably on the left side across the table with the legs drawn up. The left fore-finger, well soaped is introduced into the rectum; I prefer no glove in order to be able to feel better for the position of the advancing needle. It is useful to practise examining all prostates with the left forefinger, as it educates the tactile sensation so necessary when injecting the prostate. With the finger in the rectum examine the bay in the anterior wall, and how much this projects forward with the perineum, also examine the prostate and then decide by this touch the point where to insert the needle into the perineum, so as to avoid the bay in the rectum the needle passing in front of it. The syringe and solution is lying beside one, or in one's right hand, having been sterilized by boiling, and the needle flamed; 3 c.cm. of the solution to be used has already been drawn up into the needle. Commence the injection by inserting the needle through the perineal skin, and directing it towards the prostate one lobe or the other. The needle is soon lost in the perineum; but, its position can be ascertained by trembling the syringe and needle.

When the lobe of the prostate is reached the penetration is felt to be in something more solid than the perineal tissue. Then is the moment to inject. Now, withdraw the needle almost to the skin, and plunge for the other lobe and inject. If the needle is not well withdrawn the second penetration may go anywhere especially along the same track. 1 c.cm. should be the dose for each lobe of No. 1 solution. Using for the first two injections this No. 1 solution is, I think, important, as it reduces the inflammatory congestion which is associated with an enlarged prostate subjected to urinary effort and straining. For this reason improvement generally begins with the first injection. Repetition of the injection can be done in 4 or 5 days after any tenderness has ceased. After this little operation, the patient feels some burning, which soon subsides. He can be allowed to go home on a vehicle, or his own car, and even drive it. Next morning he has nothing to complain of.

In adenomata it is necessary to break down its tissue, and this is done by injecting No. 2 solution. I have found by experiment that new growths do not grow if injected with acids, and the only two acids one can use are citric and acetic as they form part of an ordinary diet. Hence there is no toxic effect, and no serious local irritations set up. Cases of the less malignant sarcomata can be cured by injecting this No. 2 solution: for instance, a myeloid sarcoma of a long bone can be cured by this. There is no necessity to operate, the growth shrinks rapidly and finally, ossifies and ceases to grow. Epitheliomata can be retarded but not cured, but as I have said the injections produce a more favourable condition for radium treatment. Too big malignant tumours cannot be affected as the needle cannot reach deep and imbedded parts.

In the prostate the grumous material created by contact of the adenomatous tissue with the acids is either absorbed or extruded per urethra. In this way adenomata of the size of a small hen's egg or even a full size hen's egg can be broken down and with the

removal there is increasing improvement in the obstructive symptoms. Similarly, a hard fibroid prostate can be dealt with by the acids interspaced with No. 1 solution.

The treatment is certainly an ambulant one, an average case can be allowed out and about the next day. Not necessarily to take exercise, but to attend to his office and any sedentary occupation in his business.

Mishaps (a) The puncture of the rectum is the only serious one; if this should occur withdraw the needle entirely, sterilize it and insert again in a fresh position. Injection of the prostate through the rectum, even after irrigation of the rectum, is a dangerous procedure, I have experienced one case done by another medical man when cellulitis of the perineum, scrotum and penis were set up. (b) Piercing of the urethra is of little importance, a drop or two of blood results but no after-effects. (c) Piercing of the bladder only means injecting the fluid where it is not wanted; no after-effects follow. (d) Injury to vesicula seminalis is improbable and rare. If it occurs, especially with the acids inflammation of the cord soon ensues.

Here I wish to mention " prostatism without a prostate " *i.e.* due to the prostatic bar forming across the trigone. I have had sufficient cases to show that injection of this is an effective treatment. It is done in the same way, but requires some practice and skill to inject so small and deep an object; however, if the solution is inserted and maintains some tissue pressure in the neighbourhood of the object, the same result is produced, that is absorption of the hypertrophy. I would advocate a serious and earnest trial of injection in prostatic bar.

In my own experience it took me some time and practice to do this deep injection quickly, efficiently and skillfully, and the more skillfully it is done the better the results. Exactitude is also required. The corollary is that criticism after a few injections in one case is no ground for condemning the procedures.

Illustrative Cases

Case No. 1. An old gentleman of 84 and in good circumstances was taken with acute retention of urine and found to have an enlarged prostate, he had to be catheterised twice or thrice a day; after a fortnight the agony of the catheter was so great that he wished to die and that sooner. He was too feeble and worn out for want of sleep to suggest a prostatectomy. I ask you what was there to offer him, only draining the bladder while the prostate recovered from its inflammation; when the bladder wound heal the process would be replaced again. At best it was only invalidism that was to be his fate. On my first visit I injected him there and then; that so relieved the inflamed prostate that he was able to have the catheter passed without pain. A week after a similar injection of No. 1 further improved matters and he was able to pass a little urine himself and did not require such frequent catheterisation. Four injections ensued, one a No. 2 solution, at intervals of a week, after which he declared he was all right and did not require more. He was then merry and bright and going about, getting up once, sometimes twice at night to pass urine: there was 1 oz. of residual urine, at first there were several ounces. Two months after he came himself to say he was not quite so well, two more injections followed, after each of which he went home by his motor 36 miles. The prostate had much diminished in size, and his health for 84 was very good.

Case No. 2. A gentleman whose two sons were doctors was sent to me, with a prostate of the size of a hen's egg—obviously an adenoma. I began the routine treatment first with two No. 1 solution injections, that diminished his frequency of micturition. Then I began with No. 2 solution, breaking down one lobe then the other: he passed grumous material through the urethra. In the end it took me 14 injections to cause the disappearance of the prostatic enlargement. There was no hurry in his case—so I did not push the intervals to short periods, but allowed him to move about. In both these cases had not had their bladders over distended, and rendered so atonic that recovery of expulsive power is nil, as one meets frequently enough in cases in India owing to neglect, fear of operation, and treatment by unqualified practitioners.

Case No. 3. This one was a medical man of 53 whom I know well, living at some distance. He got gradually increasing difficulty of micturition, until his colleagues in the town said there was nothing but prostatectomy to be done. He was able with great pain and difficulty to pass a few trickles every half hour. He was worn out, anæmic and miserable. It was and had been impossible to pass a soft rubber catheter.

On examination there was no prostate to be felt, except a flattened stricture against the pubic bone. It was a case of bar across the trigone.

Every injection improved his condition, at first he used to come to hospital for his injections in a vehicle, soon he was able to come on foot. After 12 injections he is very well, his health has recovered and he passes urine once at night. There has been some cystitis all along, which is now disappearing. A No. 12 sound passes easily enough through the prostate provided one avoids a sort of band against which the soft catheter hitched up.

The cases of failure are those in which the bladder cannot recover, though the prostatic obstruction has been removed. These are not infrequent as I have explained, things having been allowed to go too far.

I hope this " bar " case I have related will induce others to try this method. It requires some practice to hit off the offending hypertrophy at the base of the bladder, but it can be done.

Read at the Scientific Session of the XIII All-India Medical Conference, Karachi, December, 1936.

CASE NOTE

AN UNEXPLORED FACTOR IN THE PROGNOSIS OF PULMONARY PHTHISIS

G. C. CHATTERJEE, M.B. (Cal.), F.R.I. (Lond.), Rai Bahadur,
Calcutta

Owing to the rapid strides which roentgenoscopy is making for finding out lesions in tuberculosis of the lung, enabling the radiologist in some cases to make out well marked lesion, where the physician by his clinical methods may not find any lesion at all, or at best a doubtful one, the latter is losing self-confidence and has started relying entirely on the X-ray finding. So when prognosis has to be given on a well marked patch found by X-ray, but found indistinctly or not at all by clinical methods, the physician, in nine cases out of ten, is influenced by the radiologist's opinion in giving a prognosis. Whether it is proliferative, or exudative or mid-way between the two, and as prognosis will differ markedly according to these different conditions, he has no independent way of making out any opinion of the case. These may lead to adoption of collapse therapy, the case being treated as an active one, whereas the case may be a healing or healed one, requiring no such interference. When however the two are combined diagnosis and prognosis being made on the basis of data from both sources (radiologist and clinician), valuable information of the course of the disease may be obtained; this cannot be had, if X-ray finding be the only guiding factor. Hence development of methods of making out lesions by clinical methods re-enforced by X-ray finding, has become all the more necessary for future progress of knowledge as to how healing of tuberculosis takes place.

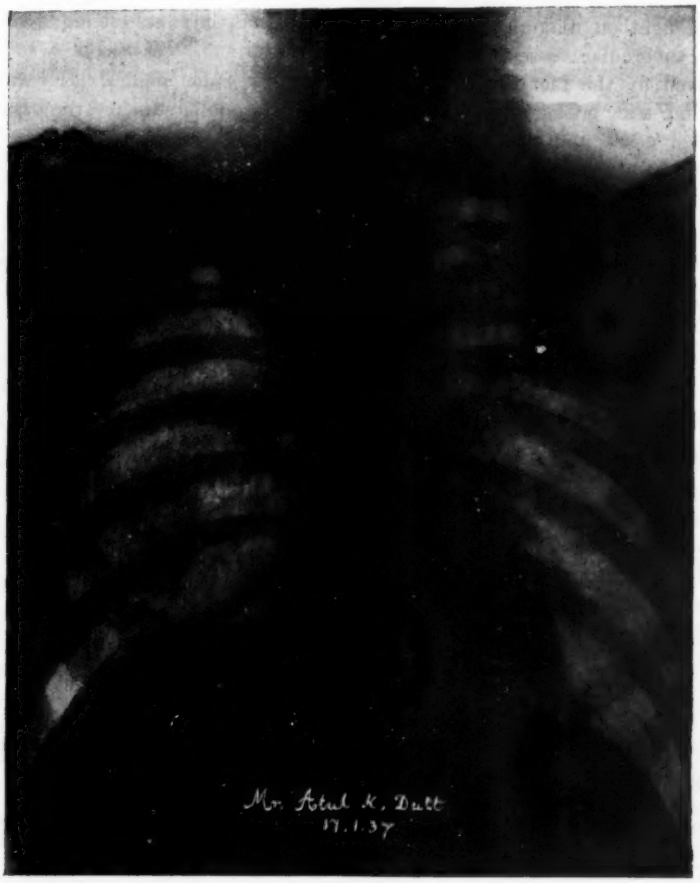
In this connection, to make the point clear, it is necessary to quote the words of Sir G. Hopkins from his presidential address to the Royal Society of Great Britain in 1934. Speaking about Charcot, the celebrated clinician he said "he taught that clinical observation must ever remain the supreme court of jurisdiction on the clinic itself, but he said that without scientific renovation, it would soon become a belated routine, as it were stereotyped." He says further "It was plain to Charcot, that fundamental sciences were the source from which clinical observation and clinical analysis must always derive their impulse for advance."

Now, one of the fundamental sciences is making out lesions by X-ray. So the clinical finding and clinical analysis in order not to be stereotyped must derive their impulse from this, as they do at present from other fundamental sciences as bacteriology, pathology, serology, etc. The following case will illustrate the point.

A man aged 35, a shop-keeper by profession came to my clinic in May, 1936, to seek relief for his following complaints—loss of appetite, cough, emaciation and slow fever. A well marked lesion was found in the right supraclavicular region. He was advised to take perfect rest at his house in Calcutta. After about a month, the fever coming down to normal, he started attending my clinic as an ambulant case, for taking a course of tuberculin injection. He started improving—no reactionary fever followed this exertion. The weight increased by 12 lbs. The physical signs gradually disappeared, and normal respiratory sounds were audible over the affected part. At that period, on 24th January, 1937, he came and complained of difficulty of breathing. He was very much upset and said there was no chance for his life. I learnt that a skiagram was taken by a radiologist on the day previous to his visit to me. He reported to the patient in writing that there were extensive lesions in both apices. On re-assuring him that these findings were of healed or healing lesions and not of active disease, as he had no fever, no cough and no loss of appetite and that he was increasing in weight, this dyspnœa and feeling of despondency disappeared.

Now, leaving aside the feelings of the patient and also the opinion of the radiologist which not being based on clinical finding, was valueless, it has become necessary to discuss this X-ray finding, as we ourselves see it without the help of the radiologist (Plate No. XLVII). A dense fibrosed patch extending from the right border of the sternum to

the clavicle will be found in the right apex. That it is in proliferative condition, is proved by the arch of the diaphragm on the right side being on a much higher level than in the left. On the left side, a big patch also in proliferative condition will be seen, occupying a good portion of the left apex (extending from 1st to 4th rib). When these lesions were detected by X-ray, none were found by clinical examination, as stated above. The finding of a lesion by X-ray over the region (right apex) where physical signs were found before, may be explained by the fibrosed remnant of the fibrocaseous lesion detected before by clinical method. But what about the patch in the left apex, which was not found clinically at anytime by me? This also is in similar fibrosed condition as the lesion on the right side, and in healed state. It presented no physical sign, due evidently to emphysematous lung surrounding the fibrosed patch, but the question is when did this lesion appear? It is quite possible that it did not begin, as an ordinary exudative lesion, as there was no history of any illness previous to this, but as a slow proliferative patch without any fever and cough and that is possible to occur, we can surmise from this case at least. We can infer also from this case that when a physician finds in an ordinary subacute



Shows a dense band-shaped patch in the right apex, extending from the right border of the sternum to the clavicle. The arch of the diaphragm is on a much higher level in the right side than in the left. A big patch in proliferative condition is seen in the left apex, occupying 1st to 4th space.

lung case, a lesion on one side, the presence of contralateral lesion in the healed lung not detectable by clinical methods may be possible. A large number of cases of this nature of symptomless fibrosed lesion may thus occur allowing the patient to remain in physiologal balanced condition—clinically negative, but detected only with the help of X-rays. The deduction may thus be drawn from this case at least (the writer has opportunity of seeing many such cases that clinical method of diagnosis and making out prognosis, is of very great importance, in correcting the severe prognosis of radiologists, when not based on clinical findings—but the latter must be renovated on the basis of the finding of X-rays. The immense potentiality of this by throwing a flood of light on making out the progress of healing in a tubercular cases is yet unexplored. This is proved by the fact that we see in almost all sanatoria and text books on tuberculosis, in giving reports of their cases, the writers make out the diagnosis as well as progress of healing or otherwise by X-ray alone. Doubt does not arise in their minds that they might make wrong interpretation of the X-ray finding. Clinical findings have not only been relegated to the background, but are not mentioned at all, even if they have examined the cases. It seems as if clinical methods have been given up altogether. A short resume made out from the progress report sheet of the case is given below.

Previous history—February, 1936, he started coughing with marked loss of appetite, which was attributed to sore throat by his previous medical adviser. A month after, he started getting fever in the afternoon. In May he sought my advice. At that time, he was getting fever 100°F. to 101°F. in the afternoon. A lesion was found in the right supraclavicular region. He was advised perfect rest which brought down the fever. Beginning from 27-6-36 he was given a course of tuberculin as an ambulant case.

Date	Dose of tuberculin in part of Mgm.	Highest Temp. recorded	Weight in pounds	REMARKS
27-6-36	10,00,000		87	Crepitation not audible.
3-7-36	800,000	99	88	Right apex, clicky sound,
11-7-36	500,000	99·6	89	cough troublesome.
21-7-36	300,000	99·6	89	
27-7-36		90	91	
	Interval of 3 weeks			
17-8-36	200,000	98	92½	Cough troublesome, right apex, crepitation audible.
	Interval of one month			
23-9-36	128,000	98	94	No sign, complains of pain in right chest, loss of breath sounds on deep breathing, crepitation audible.
7-10-36	120,000		95½	
23-10-36	80,000		97	No crepitation.
12-36			99	
2-1-37	37,000		99	X-ray taken.
24-1-37	20,000		99	No physical sign right and
2-2-37	12,000		99	left.
19-2-37	8,000		99	Do.
	Still under treatment			

References to already published papers of the writer illustrating the point raised in the paper:

1. Clinical notes of a case of acute pulmonary phthisis in which immunity could be produced. *Journal of Indian Medical Association*, No. V, 1935.

2. Clinical notes of a case of pulmonary phthisis. *Antiseptic*, January, 1936.

3. X-ray appearance seen 24 years after healing in a case of extensive tuberculosis of lung. *Indian Medical Gazette*, September, 1936.

CURRENT MEDICAL LITERATURE

MEDICINE

Course and Management of Congenital Heart Disease

PERRY (*Proceedings of the Royal Society of Medicine*, April, 1937, page 693) first reviews congenital heart disease under two main heads, *viz.*, with cyanosis and without cyanosis and those without cyanosis are further dealth with under two headings, those with arteriovenous shunt and those without it. True acyanotic cases often lead a normal life without restriction of activities but they are prone to develop bacterial endocarditis (of 60 cases of coarctatian of the aorta 20% developed bacterial infection at the site of constriction) and every effort should be made to eliminate any source of infection, specially the infection of the mouth and upper respiratory passages. The prognosis in acyanotic cases is good. But in cyanotic cases the earlier in life that cyanosis develops the more serious is the outlook. The depth of cyanosis and severity of the symptoms will determine the prognosis and also the treatment. Nothing can relieve the condition and the activity of the patient must be determined by his capabilities—he may lead a long though restricted life. Prevention of superimposed bacterial infection is also useful in this group of cases. The author then relates his own experience which is limited almost to the school children. According to his statistics majority is of acyanotic type, the commonest defect is the patent interventricular septum with no symptoms referable to the heart and with no restriction of activities. The other common cardiac defect was patent ductus arteriosus which occurred in 40 cases all leading normal lives with the exception of 4 cases who could not join the games. Subaortic stenosis was less common occurring in 10 cases none of whom suffered any diability.

Significance of Electrocardiographic Changes and Prognosis of Myocardial Diseases

MAY (*Medizinische Klinik*, Jan. 29, 1937, page 157) points out that it is easy for one to detect from the electrocardiogram the presence of a myocardial defect but it is often impossible from a single study to estimate the condition of the myocardium. The electrocardiogram only reveals the changes but does not determine how long such changes have existed. Repeated electrocardiographic studies made in diphtheria and disease of the coronary vessels show that new myocardial lesions become manifest in rapidly changing electrocardiograms, the most important feature of such a lesion being the cessation of the uniformity of the electrocardiograms. The author further notes that the constantly changing records indicate unfavourable prognosis inasmuch as those cases develop later on symptoms of circulatory insufficiency.

Prostigmin as an aid in the Diagnosis of Myasthenia Gravis

HARVEY AND WHITEHALE (*Journal of American Medical Association*, April 17, 1937, page 1329) point that subcutaneous administration of 1·5 mg. of prostigmin with 0·6 mg. atropine sulphate is a valuable aid in the diagnosis of myasthenia gravis as evidenced by immediate relief of symptoms in 9 proved cases of myasthenia gravis with no improvement in 14 other neurologic disorders.

The Significance of Gonococcus Complement Fixation Test as a Diagnostic aid in Arthritis

WARREN AND ASSOCIATES (*Journal of American Medical Association*, April 10, 1937, page 1241) from a study of 614 gonococcus complement fixation tests done on 316 patients with various types of arthritis observes that the test is quite efficacious as a diagnostic aid in this disease. They observe that of 125 tests done on 74 patients of proved or provable gonococcal arthritis 81·6% gave positive reactions during the course of arthritis. Of 239 cases of arthritis of other type 91·6% gave constantly negative results. The authors conclude by saying that if the technique of the test is improved it is possible that *it* will approach the Wasserman test in its degree of accuracy.

Acromegalia et Megalia Cutis (Cutis Verticis Gyrata)

TOSHKOV (*The British Journal of Dermatology and Syphilis*, Feb., 1937, page 55) writes that no

mention is made in the usual clinical picture of acromegaly about the enlargement of the skin of the scalp. There is a marked hyperplasia of all its parts with the formation of the folding-up of the skin over the cranium. These folds are separated from one another by furrows which usually run in the direction from the forehead towards the neck but in the neck region they run in the direction from ear to ear and resemble the diffuse lipoma of the fat men. The skin is very mobile over the bone beneath. The author then reports 4 illustrative cases with pictures showing the skin lesions.

Frequency of Artificial Pneumothorax Refills

Franklin and Associates (*American Review of Tuberculosis*, April, 1937, page 513) from observations on 65 cases in which refills were done every day for several weeks instead of the usual method report that satisfactory collapse of the lung is produced more rapidly, *i.e.*, in an average time of 10·4 weeks as opposed to 22 weeks by the old method, thus shortening the patient's period of disability by a marked degree. The only objections to the mode of refills are (1) excessive cost to the patient, (2) the chance of more frequent occurrences of pleural effusion. But the percentage of pleural effusion in this series was 30% which is not higher than that found in cases treated by the ordinary method. The result is encouraging and suggests further trial of the method.

Contralateral Bronchial Infection in Pulmonary Tuberculosis

Wu and Tang (*American Journal of Radiology and Radiotherapy*, Feb., 1937, pages 145-92) from the study of 242 selected cases of pulmonary tuberculosis observes that there exists in either lung a site of predilection for contralateral bronchial infection. For the right lung it corresponds to the third of the lung lying midway between apex and the upper margin of the middle lobe and for the left lung it corresponds to one-fifth of the lung field midway between apex and base and in the x-ray films corresponds to the third anterior space. The infection may travel from the right lung to the left and vice versa. In 90% cases a cavity existed in the primarily affected lung and in 90% of the cases the contralateral infection was found in the second interspace in the right side and the third interspace in the left and the infection is usually brought about by aspiration.

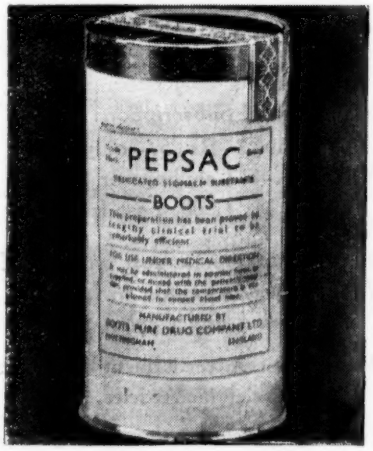
Colloidal Aluminium Hydroxide in the Treatment of Peptic Ulcer

Jones (*American Journal of Digestive Diseases and Nutrition*, April, 1937, page 99) reports on the successful results obtained by colloidal aluminum hydroxide in 24 cases of x-ray positive peptic ulcer. He observes that all but one got complete relief of symptoms, three gradually but the rest very promptly the average time taken for the relief being 3 days. Of the 16 patients who were re-rayed 13 (nine duodenal and four gastric) showed disappearance of the ulcer-signs in an average of 30 days.

Treatment of Brain Oedema

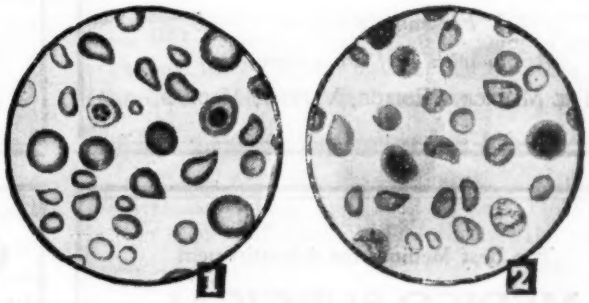
Young (*Nabraska State Medical Journal*, Dec., 1936, pages 441-46) reviews the causes of brain œdema under 3 headings, *viz.*, (1) alterations of tissues (infection, toxæmia, chemical); (2) disturbance of osmotic pressure (loss of blood protein, disorder of salt metabolism); (3) increased capillary permeability (vascular disease, shock associated with cerebral trauma). The treatment depends on these different etiological factors and several of these factors may be present in a single case. In dealing with the factor of alterations of tissues the elimination of the infection by all possible means is essential and the use of antitoxin is one of the effective measures at hand. The second factor, *viz.*, the disturbance of osmotic pressure is most effectively treated by intravenous administration of hypertonic glucose solutions. In increased capillary permeability pituitrin and ephedrine are used if not contraindicated; glucose also helps in reclaiming the lost blood volume and when the increased permeability is due to anæmia caused by decreased blood supply caffeine is indicated. Caffeine according to the author is the much neglected drug in brain œdema and is useful in combating the relative anæmia caused by the increase in brain volume, in lowering intracranial pressure and in producing diuresis by decreasing the blood volume and allowing a return of blood to the circulation. Dehydration therapy in shape of reduction of water intake to as low as 600 c.c. and the administration of mag. sulph. by mouth or per rectum (except in shock) is often successful. Lumbar puncture with slow drainage relieves intracranial tension and combats compression anæmia. The head end of the bed should be raised except in cases of shock or with extreme cerebral anæmia. In cases of brain œdema with severe compression anæmia and greatly increased cerebrospinal fluid pressure which often lead to

The Latest Treatment for PERNICIOUS ANAEMIA



PEPSAC

PEPSAC is a desiccated stomach powder for the treatment of Pernicious Anaemia, prepared from fresh, healthy hog's stomachs which have been subjected to critical veterinary inspection before use. Every stage of manufacture is controlled bacteriologically, and the desiccation is carried out under the most exacting conditions in order to preserve the haemopoietic principles of the stomach tissue.

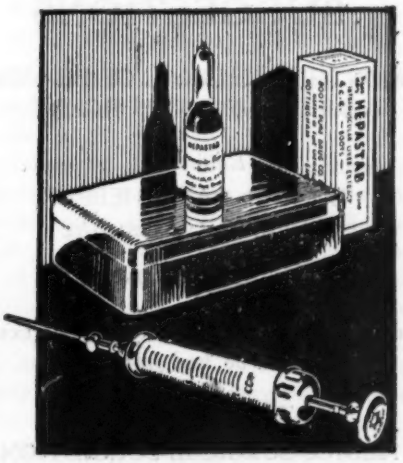


1 BLOOD film from an untreated case of Pernicious Anaemia, showing anisocytosis, poikilocytosis, polychromasia and nucleated red cells.

2 BLOOD film from a case of Pernicious Anaemia after eight days' treatment with Pepsac, showing reticulocyte response. 32% of reticulocytes.

HEPASTAB

TREATMENT for Pernicious Anaemia may be administered either by the mouth or given parenterally in the form of a specially prepared extract of liver such as HEPASTAB. Intramuscular administration of liver extract has been found to be a particularly satisfactory way of introducing the necessary anti-anaemic principle, as more uniform results are obtained in a shorter time than with oral therapy. It is therefore specially indicated in the treatment of patients who are seriously ill or who cannot take adequate amounts of oral liver on account of gastric intolerance.



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SURGERY

Non Drainage of Peritoneal Cavity in Appendiceal Peritonitis

CAFRITZ (*Journal of American Medical Association*, April 17, 1937, page 1315) reviews the literature on the subject and reports on the very encouraging results obtained in 25 personal cases of appendiceal peritonitis by removing the focus of infection and closing the abdomen with the introduction of a rubber tissue drain down only to the closed peritoneum. He points out that in appendiceal peritonitis drainage is contraindicated except in such cases where the primary focus of infection cannot be removed or where a large amount of necrotic and contaminated material is left behind in the abdominal cavity or in cases of walled off abscess. The non-drainage of the peritoneal cavity produces less morbidity and less mortality, lessens the incidence of post-operative mechanical ileus, shortens the period of illness, and minimizes the tendency of producing post-operative hernia, fistula or adhesions.

Evacuation of the Gall-bladder in Peptic Ulcer Patients

BOYDEN AND BERMAN (*Radiology*, March, 1937, page 273—81) investigated on the rate of evacuation of the gall-bladder by noting its changing volumes in a series of cholecystograms taken at 2, 4, 8, 12, 16, 20, 25, 30, 35 and 40 minutes after a standard meal of four egg-yolks and milk. The visualisation was obtained by oral administration of "iodeikon" and it was postive in 30 out of 33 peptic ulcer patients. The study shows that peptic ulcer increases the rate of evacuation of the gall-bladder and it is suggested that the increased tonus of the stomach in ulcer cases is responsible for the rush of the food in the duodenum and consequent faster emptying of the bladder—the vagotony may also relax the sphincter of Oddi. (The influence of free acid on the production of cholecystokinin and that of cholecystokinin on emptying of the bladder has not been discussed).

Divinyl Ether—A General Anæsthetic

RAVDIN AND ASSOCIATES (*Journal of American Medical Association*, April 3, 1937, page 1163) report on the marked success obtained by the administration of divinyl ether as a general anæsthetic of shorter type in 2,675 cases of wide variety of lesions. The anæsthesia is produced quickly and maintained easily, recovery also being very rapid and post anæsthetic complications rare. It is more toxic than diethyl ether but less toxic than chloroform. It can be used quite safely for anæsthesia of short duration.

The Use of Staphylococcus Toxoid in Chronic Osteomyelitis

BUCHMAN (*Journal of American Medical Association*, April 3, 1937, page 1151) in reporting on the immunizing effect of staphylococcus toxoid in 28 cases of chronic osteomyelitis observes that after the administration of the toxoid the antihæmolysin (antitoxin) titres increased in all the cases from two to thirty-four times the original titres but this increase in titre did not expediate the healing of the existing lesions nor did it prevent the formation of new ones. He further points out that the disappointing results obtained go to show the low toxogenicity and high invasiveness of staphylococcal infections and he maintains that attempts should be made more to establish resistance to the invasiveness of the organism rather than to produce antitoxic immunity.

The Use of Urea in the Treatment of Infected Wounds

HOLDER AND MACKAY (*Journal of American Medical Association*, April 3, 1937, page 1167) report on the successful results obtained by the use of saturated solution of urea in various wounds particularly in those where other therapeutic measures have failed. Urea acts by dissolving proteins and removing debris, encrustations and dead tissues. Urea is cheap, non-irritating and a great deodoriser.

Nasal Ventilation in Diagnosis and Control of Headache

PARKINSON (*Archives of Otolaryngology*, Nov., 1936, pages 594-599) observes that the local use of ephedrine in normal saline causes a shrinkage of the mucous membrane of the nose and sinuses and restores ventilation in these structures and also the function of the mucosa. Long standing recurrent headache of local origin (as a result of undue positive and negative pressure in a sinus or contact pressure of swollen intranasal structures) can be quickly and accurately differentiated from that of neuralgic type in a majority of cases by the positive test of ventilation obtained by using the above method keeping the patient in lateral head-low posture. Diagnostically the negative test is not reliable. The effect of shrinkage and displacement using the lateral head-low posture is also manifest when it relieves promptly the pain occurring in acute frontal sinusitis with the

accompanying drainage of pus without taking recourse to intranasal instrumentations which is only essential in such instances where the bulbous middle turbinate almost obliterates the middle meatus.

Treatment of Hæmorrhage in Nonhæmophilic Patients with an Estrogenic Substance

Heinberg (*Archives of Otolaryngology*, Dec., 1936, page 758) reports on the very striking results obtained by subcutaneous injection of 25 to 50 rat units of theelin in post operative bleeding (tonsillectomy in 3 cases and combined tonsillectomy and adenoidectomy in the other) in nonhæmophilic cases. The result is very encouraging and suggests further trial of the drug.

OBSTETRICS AND GYNÆCOLOGY

Prevention of Puerperal Sepsis

Colebrook (*Journal of Obstetrics and Gynæcology of British Empire*, 1936, 43:691) points out that the causative organism in cases of puerperal sepsis where labour is attended with little or no trauma is undoubtedly hæmolytic streptococcus but it is not always the case in cases where there is injury to the maternal tissues during child-birth. The source of hæmolytic streptococcus is such common septic conditions as tonsillitis, scarlet fever, otitis media, mastoid disease, nasal sinus infection, wound infections of all kinds, influenza and common cold and the author has recently shown that air is also a potential source of infection. For prevention of puerperal sepsis he advised the following steps to be taken, viz., early recognition in pregnant women of such infective conditions as mentioned above and immediate and thorough eradication of such trouble; recognition of such infection in any case in the maternity institution or in a member of her household and prompt removal and isolation of such a case; the providing of provision against the patient getting infected from her own nose and throat; the prohibition of conduction of labour by nurses who dress wounds and attend all sorts of infective cases; the wearing of mask during labour; the cleansing of the vulva and hands first with soap and water followed by such antiseptic as dettol and also disinfecting of the hands of the patient in the similar way.

Achlorhydria—An Ætiologic Factor in Pruritis Vulvæ

Swift (*Journal of Obstetrics and Gynæcology of British Empire*, December, 1936, page 1053) observes that there is definite achlorhydria in pruritis vulvæ, leukoplakia, kraurosis vulvæ and leukoplakic vulvitis and this achlorhydria causes a deficiency of absorption of vitamin A from the diet. Where achlorhydria is absent probably the diet itself is deficient in vitamin A. 42 women suffering from this troublesome pruritis were relieved of the itching by taking hydrochloric acid with and after meals with the concomitant improvements in the local vulval condition. Vitamin A in the shape of cod liver is also given. Excision of the vulva will be unnecessary and the incidence of epithelioma will become more rare if this treatment is started early. Local treatment in the shape of a soothing ointment such as one containing zinc oxide, starch and sweet almond oil is necessary only in very bad cases and anæsthetic ointment is used in only rare cases.

Ergometrine

Wirth (*Munch. Med. Wschr.*, Feb. 26, 1937, page 324) reports on the success achieved by fifteen months' trial of ergobasine which is also called ergometrine or ergotocin or ergosterin by others. He tried either ergobasine tartrate solution alone in strength of 0·2 mg. in 1 c.c. for injection and 0·25 mg. in 1 c.c. for oral use or a mixture containing 0·125 mg. ergobasine tartrate and 0·25 mg. of ergotamine tartrate in 1 c.c. The contraction of the uterus in cæsarian sections occurred within 10 to 20 seconds of the intramural or intravenous injection. When given orally ergobasine solution lessened the incidence of lochial stasis and sub-involution, helped in the control of puerperal hæmorrhage and expulsion of the placenta. No untoward symptoms were observed after its use.

Suprarenal Cortex Therapy in the Vomiting of Pregnancy

Freeman and Associates (*American Journal of Obstetrics and Gynecology*, April, 1937, page 618) from the results of 78 pregnant women treated for vomiting and nausea with Armour's suprarenal cortex observe that it is a quite effective remedy for various types of vomiting during pregnancy. In very severe cases and in pernicious type of vomiting the results were cent. per cent. cure from 3 to 5 days and in no instance the nausea and vomiting increased necessitating the termination of pregnancy. The results obtained by the authors are encouraging and warrant further trial of the remedy.

The Value of Hysterosalpingography in Gynæcologic Diagnosis

Mathieu (*Radiology*, April, 1937, pages 427-37) writes that gynæcologist will find hysterosalpingo-

graphy valuable in visualising the condition of the internal os, the size and contents of the uterine cavity and the patency of the tubes and thus with its aid will be able to diagnose any intra-uterine tumor or abnormality of the uterine and tubal cavities, *e.g.*, uterine subinvolution, infantile uterus, tubal kinks. He will be able to diagnose and localize tubal pregnancy, abdominal pregnancy and adenomyoma. The author points out that when the aid in diagnosis will be more used fewer hysterectomies would be performed when curettege would suffice and few curettege would be done when hysterectomy is necessary. He then describes the technique in detail. The amount of oil injected is usually from 5 to 8 c.c. and the amount of pressure used should scarcely be more than that used in giving ordinary injections. The only contra-indications to its use are active serious infection of the genital tract and normal pregnancy. Very few untoward effects have been reported in the literature.

PATHOLOGY AND BACTERIOLOGY

Comparative Study of Cytoplasmic and Nuclear Changes in Neutrophiles in Severe Infectious States

MENDEL AND ASSOCIATES (*American Journal of Medical Science*, 192:316, 1936) observe that in disease conditions certain toxic and degenerative cytoplasmic changes are found in the leucocytes in addition to the nuclear changes and they are (1) alteration of the staining quality of the cytoplasm, (2) abnormal granulation and (3) vacuolation. These changes are manifest only on special staining—Jenner Giemsa stain modified by Kugel and Rosenthal. Basing on these changes the last two authors have formulated degenerative index, *viz.*, D. I.=

$$\frac{\text{the number of degenerated leucocytes}}{\text{the number of total leucocytes}}$$

The authors note that this D. I. is a great aid in differentiating a localised infection from a generalised one, in determining whether there is an actual pus formation in an inflammatory process and also in indicating development of complications. When the D. I. is high the prognosis is grave. In 60 cases of severe infection they have studied the comparative value of both the degenerative and Schilling indices and they observe that in 20 cases they were equally valuable, in 36 D. I. was superior to S. I. and in the remaining 4 S. I. was superior to D. I. If a single examination is done the degenerative index is more reliable than the Schilling index.

Hæmatological Studies in Hypothyroidism Following Total Thyroidectomy

STERN AND ALTSCHULE (*Journal of Clinical Investigation*, 15:633, 641, 1936) report on the hæmatological studies made on 64 cases of total thyroidectomy for relief of cardiac trouble. There is a mild degree of anæmias which was macrocytic and hyperchromic in type and was not amenable to the liver and iron therapy but was soon controlled by the administration of desicated thyroid. The white cells and platalets were also decreased. These observations go to show that this anæmia was due to the lack of thyroid hormone stimulating the bone marrow and not due to the deficiency of Castle's factors or iron deficiency.

Study of Glycæmic Response in Patients with Biliary Tract Disease

RAFSKY (*American Journal of Digestive Diseases and Nutrition*, April, 1937, pages 83-87) observes that there is a decreased glucose tolerance in non-diabetic patients with gall stone disease than in those without it and that after cholesystectomy there develops a distinct improvement in the glucose tolerance in majority of such cases. The clinical observation made during the investigation go to show that the hepatic dysfunction more than the pancreatic impairment is responsible for the disturbed carbohydrate metabolism. He advises early removal of the gall stones as it will lessen the incidence of diabetes mellitus in those patients.

Metabolic Studies of Eskimos in the Canadian Eastern Arctic

RABINOWITCH AND SMITH (*Journal of Nutrition*, Oct., 1936, page 337) report on the metabolic studies of 46 Eskimos, the average diet of an adult Eskimos being approximately 40 gms. of carbohydrate, 250-300 gms. of protein and 150 gms. of fat. The non-protein nitrogen, urea nitrogen, amino-acids nitrogen, chloride percentages in the blood showed high values. Polycythæmia was found in a certain number of cases and the copper concentration was on the average four times as high in the urine of Eskimos living on the usual high protein diet as among Eskimos getting on a diet having proportionate amount of civilized man's food. There was no glycosuria and ketonuria. Blood sugar curves after injection of 50 gms. of glucose showed in 13 cases high values, the average value after 30 minutes being 0·21%. Urine showed traces of sugar in six cases. The respiratory quotients were

from 0·66 to 0·70 in six of ten cases. The average basal metabolism was plus 26%.

A Simple Method of Staining Fungus Elements in Scales and Hair

MILOCHEVITCH (*Der. Wochenschr.*, 1936, No. 11, page 320) criticizes the staining method described by Alkiewicz and Gorny, and also the method of clearing specimens by caustic potash solution. For this purpose he prefers Amann's technique, which is as follows:

Chloralum hydrat. crist	...	20 grm.
Acid. carbol. crist	...	10 ,,
Acid. lacticum pure	...	10 ,,

For particularly dark material he recommends the following modification:

Chloral hydrat. crist	...	40 grm.
Acid carbol. crist	...	40 ,,
Acid lacticum pur.	...	30 ,,
Sodium Salicylas	...	10 ,,

The material is placed on a slide and covered with a drop of the solution. Similarly, a drop of the solution is placed on the under-surface of a cover-glass, after which the latter is dropped on the slide. By this method the formation of air-bubbles is avoided. The preparation is ready for examination when it has been warmed over a flame. This method has the following advantages: the fluid remains stable for several mouths; the preparation is clear; the finest elements are visible. Spores have a slightly green tint, and may be seen very distinctly; there are no artefacts.

—*Summary Current Literature, The British Journal of Dermatology and Syphilis.*

A FEW REFLECTIONS AFTER 29 YEARS OF MEDICAL SERVICE IN INDIA

H. STOTT, M.B., F.R.C.P., D.P.H., LT.-COL., I.M.S.,
King George's Medical College, Lucknow.

It is to emphasize my definite support to the view that teachers in medical institutions have a duty outside their spheres as professors of colleges to the general practitioners that I venture to review a few random notes in the hope that they may be of some interest and help and a stimulant to that great body of medical practitioners in whose hands rests the honour of the real achievement of the alleviation of diseases amongst the masses.

I propose to group my remarks and experiences under (1) advancements in knowledge, (2) medical education, (3) politics and (4) etiquette. These remarks cannot in any way be as complete as one would wish, but represent just a brief glance at a few prominent subjects, exemplifying advances in medical knowledge with which I have been associated since coming to the United Provinces.

ADVANCES IN MEDICAL KNOWLEDGE

(1) *The Recognition of Outbreaks of Mosquito Dengue in Lucknow.* Outbreaks of mosquito dengue (seven-day fever) were at first believed to occur only at sea-port towns. The first inland outbreak recognized by me occurred in Lucknow in 1925. There is little doubt this fever occurred before, and is an almost annual occurrence. Details were published in the *Indian Medical Gazette*, of July, 1926.

(2) *Diabetes.* Much research work has been carried on over many years in the King George's Hospital. The two types of diabetes (I. an acute thin type and, II. a chronic fat type) have been clearly defined and other stages through which these types are apt to develop, *viz.*, I. the acute type through stages of (a) wasting, (b) ketosis and (c) ketogenic coma and II. the chronic type through stages of (a) preglycosuria, (b) intermittent glycosuria, (c) continuous glycosuria with symptoms, (d) complications and (e) arterio-sclerosis terminating in uræmia, with their respective treatments, have been clearly separated.

(3) *The cause of mitral stenosis in young Indians.* Between 1922 and 1929, twenty cases of congestive heart failure in young Indians between 12 and 18 years of age came under my care. The question arose as to the cause. Mitral stenosis in Europe (in some 90% of cases) was known to be caused by previous rheumatic infection. But rheumatic infection was not believed formerly to afflict Indians. The previous general teaching had been opposed to this. But I had seen definite acute rheumatic syno-

vitis, also acute rheumatic endocarditis and also chorea. Contact with other teachers and other observers of wide experience substantiated the widespread occurrence of acute rheumatism in Indians. Other possible causes of mitral stenosis were excluded and two conclusions were reached:

(i) That previous rheumatic infection in childhood was the cause of the very common mitral stenosis in young Indians.

(ii) That early acute and subacute rheumatic infection in young Indian children was being overlooked and not diagnosed. I especially commend this last point to this congress of practitioners.

The results were published in the *I. M. G.* of February, 1930, and this was followed by papers from many parts of India supporting and confirming the findings.

(4) *The Distribution of Lathyrism* in the United Provinces with some experimental work on its cause (which was not positively determined was reported in the *Indian Journal of Medical Research* for July, 1930).

(5) A large amount of research through 10 years between 1925 and 1934 on '*The Distribution and Cause of Endemic Goitre in the U. P.*' was published in the *Indian Journal of Medical Research* from April, 1931 to January, 1934, covering its distribution, clinical features, ætiology, naked eye and microscopic anatomy, cause, prophylaxis and treatment—including observations on subthyroidism, cretinism and deaf-mutism in the endemic areas. This work proved of great interest. The cause of endemic goitre was concluded to be a chemical upset in the calcium-iodine balance of the body. Though everywhere in the endemic areas, iodine along with other vital food elements was lacking in the dietary, yet the decisive factor in the goitre production of these provinces was the drinking of water containing a great excess of calcium. The cure of developing goitre in school children by the routine daily administration of a few drops of iodine in water was proved by large scale experimental work.

(6) The actual phagocytosis of medical parasites by large mononuclear cells in a severe case of malignant tertian malaria observed in 1932, was published in the *I. M. G.* of September, 1932. This was amongst the first papers in India containing a description of this process and an explanation of the mechanism of immunity in malaria'' on that basis.

(7) Sporadic typhus of unknown (? Tick) vector has long been associated with this Province since the days when Sir John Megaw, then my predecessor in the Pathology Department of K. G. Medical College, described the first published case with himself as the patient. Since then I have seen two certain cases in the plains of this Province—and its distribution is certainly far wider than as yet recognized. General practitioners should be on the look out for sporadic cases of typhus. In one case, I was especially fortunate in being able to investigate widely the blood serum changes. This case was published in the *I. M. G.* of June, 1935, under the title " The Immunological Problems of the Typhus Fever Group, with a note on the History of Tick Typhus in India.''

(8) *The use of stramonium for the rigidity and drowsiness following encephalitis lethargica* was reported in the *I. M. G.* of November, 1935. Many of us have seen these pathetic cases. Everywhere in European mental and special nerve hospitals the use of stramonium to control this condition is well recognized to make the difference between many of the patient leading an active life or merely existing as a rigid sleeping corpse. But in India, so far, the great value of stramonium is not recognized and if you have such a case I would strongly advise you to try stramonium in the doses laid down in that paper.

(9) The great frequency of ankylostomiasis amongst labourers in this Province as elsewhere in India, its terrible effects in the production of chronic and most serious ill-health amongst the young adults in the prime of life, its ease of diagnosis and of treatment, has constantly been before me. I have been deeply impressed with the terrible inefficiency it produces—and can only hope the day will one day come, as indeed it will, when this serious infestation will be eradicated. Meanwhile general practitioners can easily, cheaply and efficiently treat this condition.

(10) *Liver Cirrhosis* which is so much commoner in Indians in India than in Europeans in Europe, has much interested me in later years and the proof has come to me that malaria infection, especially when severe enough to produce malarial cirrhosis of the spleen is one certain cause of liver cirrhosis in India to what degree may be uncertain, and must be decided in each individual case.

II. Medical Education

Naturally I have seen great changes in this Province, but my remarks must be very brief. Perhaps first one would mention Queen Mary's Hospital, and the training of our students therein in practical midwifery to an extent of 242 labours last year. Then there have been the taking over of the Leper Hospital, the building of the Infectious Fever Hospital, and the Tuberculosis Hospital; the establishment of clinics in specialities in Hospital Out Patients (Ear, Nose and Throat, Skin and Venereal diseases, Teeth, Psycho-Neurosis, etc.), the development of the X-ray section in diagnosis and therapy till it has become of provincial importance, improvements in medical students' curriculum; and contributions to the procedure of the Medical Council of India. The education of our medical students is a sacred trust which it is our first duty to guard with every possible endeavour. And here I think we may take a special pride in the standard of education imparted at King George's Medical College. The examiners sent out by the Royal College of Surgeons of England expressed the view that the Medical College at Lucknow was second to none in the British Empire. This was high praise indeed. The Inspectors of the Medical Council of India reporting on our courses of study, and on our examinations found both "satisfactory" so that the Medical Council of India and the General Medical Council of England have both recognized our degrees. Further, I am informed that Lucknow Medical College was the one medical college in India on which no adverse criticism was made by the inspectors. That may have been because our shortcomings were luckily not observed, but there it is. The Agra Medical School, to my personal knowledge through fifteen years, has come to a far higher standard of efficiency than ever before—but there is of course room for further improvement as indeed appertains to every venture in life.

III. Concerning Politics

I believe it is the duty of every medical man to stand aside from all temptations to take any part or side in general politics. That is not our part in life. In any contest (even war) the medical man should be distinguished as one out to help all sufferers to whatever side they may belong. But within our profession our own politics must be attended to, and here two lines have always seemed to me to be worthy of close attention by an association like your own:—

(I) The development of the closest cooperation and friendship between all practitioners of the scientific system of medicine, to whatever so-called grade they may belong. Our common enemy is ignorance and superstition. We practitioners of the scientific system have to unite to defeat those enemies. It is a first duty of your Association, I conceive, to watch this battle. L. M. P's. and graduates of India or of abroad must unite and gain the confidence of the masses of the people in our art and science—if we are to succeed. United we stand divided we fall.

(II) An association like yours, it seems to me, should endeavour to see that every practitioner gets some fee however small, for the skill and care he bestows in any case. In India there are so many who claim free services from medical men. There should be some means devised of keeping such claims in check so that the practitioner may receive his due in coin as well as in thanks.

I myself, as one whose latter years have been spent in endeavour to raise the standard of medical education and practice in India, would much like to see the closest possible co-operation develop between your association and the British Medical Association. The whole independent profession in India practising scientific medicine would thereby gain a most powerful friend and ally in your work, which will react greatly to your material advantage.

IV. Medical Etiquette

I feel sure I cannot close these random experiences better than by the following fine quotation which gives us pride to remember and to quote those who would scoff at medical etiquette:

"No profession is more exposed to the temptation to forget honour, humanity and kindness than is the medical profession; and there is none in which the exploitation of human suffering is easier. Yet there is none in which the temptation is more triumphantly withstood.

Let this be remembered by the public, when they feel inclined to sneer at medical etiquette, as if it were a code for maintaining selfishness and enrichment. Medical etiquette is the salvation of the patient."—John St. Loe Trachey.

The development and maintenance of a high degree of medical etiquette between every member of the scientific system of medicine therefore should ever hold a high place in the constructive work of the Indian Medical Association.

Read at the III U. P. Medical Conference held at Allahabad on 30th October, 1936.

ASSOCIATION NOTES

RAWALPINDI BRANCH

The following are the office-bearers of the Rawalpindi Branch of the Indian Medical Association for the year 1936-37.

President—Dr. S. D. Vaina, L.R.C.P. & S. (Edin.), L.R.C.P. & S. (Glas.).

Vice-President—Dr. Carleton, M.B., CH.B. (Edin.), M.D. (California).

Secretary—Dr. R. C. Suri, M.B., B.S. (Bom.), D.P.H., D.T.M. & H. (Lond.).

Joint Secretary—Dr. A. S. Baxi, M.B., B.S. (Pb.), L.R.C.P., M.R.C.S., D.O.M.S. (Lond.).

Treasurer—Dr. I. N. Chadha, M.B., B.S

Executive Members—Drs. Harnam Singh, M.B., B.S. (Pb.), L.M. (Rot.), D.O.M.S. (Lond), and Jaswant Singh, L.M.P.

Organising Secretary—Dr. Diwan Singh Bhalla, M.B., B.S.

* * *

The following resolution was passed by the Rawalpindi Branch of the Indian Medical Association in a meeting held on the 15th May, 1937, at 8 p.m. in Dr. Harnam Singh's Surgery:—

> "This meeting of the Rawalpindi Branch of the Indian Medical Association condemns the policy of reorganisation of I. M. S. as announced in the Government of India Communique dated 15th March, 1937: the Association holding that the policy meant perpetuation of the European element in Service and elimination of the Indian element."

U. P. PROVINCIAL BRANCH

Proceedings of a meeting of the Provincial Council of Indian Medical Association, U. P. Provincial Branch, held on Wednesday, the 14th April, 1937, at 2-30 p.m. at the house of Capt. K. P. Bagchi at Agra:

Members present:—Capt. K. P. Bagchi, Vice-President, in the Chair, Drs. S. B. Vyas of Meerut, G. R. Tandon of Agra, R. C. Chaurasia of Meerut, Bhupal Singh of Meerut, R. N. Bose of Meerut, Murari Lal of Agra, T. C. Basu Choudry of Agra, S. N. Banerji of Meerut, Suraj Mal Sarin of Dholpur.

Dr. Sarin and Dr. Bose were specially invited to attend.

The proceedings of the Working Committee meeting dated the 24th January, 1937, were read and confirmed.

Accounts for the 1st January, 1937, to 31st March, 1937, were passed.

Dr. Bhupal Singh, the Hony. Provincial Secretary, gave an account of the activities of this Provincial Branch in implementing these resolutions and also explained the actions taken in forming new branches in those districts of U. P. where there is none.

Resolved that report of the Provincial Secretary be noted and approved.

Resolved that Dr. R. N. Bose be elected as Headquarter and Working Committee member in place of Dr. S. Halder.

Resolved that the Vice-Presidents and other office-bearers including the Headquarter members under Rule 6 Section 3 shall be elected annually at annual general meeting of the associations from amongst the names recommended by the Provincial Council excepting Headquarter Joint Secretary, who shall be the nominee of the newly elected Provincial Secretary.

Proceedings of the Central Council of the 12th February, 1937, were read and noted.

Resolved that this Provincial Council of I. M. A., U. P., strongly disapproves of the new policy of Government of India as stated in their last communique in as much as it not only goes against the policy of Indianisation of I. M. S., but it further introduces racial discrimination against Indians by dumping European I. M. S. officers on the Provinces at the expense of Indian I. M. S. officers.

Dr. R. N. Bose proposed the following amendments to the rules of U. P. Provincial Branch of I. M. A.:—

(a) That in Rule 6 (2) one representative of branches having a minimum membership of 5 be allowed.

(b) That the quorum for a meeting of Provincial Council be reduced to seven in Rule 6 (3).

(c) That in Rule 7, line 4 the word " Council " be replaced by the word " Association."

After a discussion it was resolved that the proposal be circulated amongst the U. P. branches for opinion with a recommendation of this Council and then considered at the next meeting of the Provincial Council.

BHUPAL SINGH,
Hony. Provincial Secy.

K. P. BAGCHI,
Vice-President, Chairman.

DELHI BRANCH

Proceedings of the Annual General Meeting of the Delhi Branch of the I. M. A. held on the 30th March, 1937.

The IV Annual General Meeting of the Indian Medical Association, Delhi Branch, was held on Tuesday, the 30th March, 1937, at 8 p.m. at the D. M. A. House, Daryaganj, Delhi. Dr. J. K. Sen was in the Chair and fifteen members were present.

1. Honorary Secretary read the minutes of the III Annual General Meeting and resolved that the minutes be confirmed.

Honorary Secretary read the annual report of the year ending 30th September, 1936, and resolved that the report be adopted.

2. Audited Annual Statement of Accounts for the financial year ending 30th September, 1936, were read and duly adopted.

3. President addressed the house in brief drawing the attention of the house towards the necessity of increasing the membership and to try and amalgamate the Delhi Medical Association to the Indian Medical Association. President also referred to the recent communique dated 25th March, 1937, of Government of India regarding reorganisation of I. M. S. pointing out the fact of reduction of Indians in the cadre of I. M. S. and the increase of Civil posts for the Britishers in the I. M. S.

4. The house then proceeded to elect the members and office-bearers of the Executive Committee and the following were duly proposed and unanimously elected:—

President—Dr. J. K. Sen.

Honorary Secretary & Treasurer—Dr. G. N. Khanna, M.B.B.S.,

Other Members—Drs. P. N. Bhargava, M.B., M.R.C.P., Mrs. C. Solomon, B.A., M.B.B.S, B. C. Sen, L.R.C.P. & S., S. R. Chopra, M.B.B.S., S. C. Sen, M.B., D.M.R.E., A. Roy Chowdhury, M.B.B.S., and S. N. Mitter, D.O.M.S.

Representative to the Central Council—Mool Singh Bazaz, M.B.B.S.

5. Circular letter from the Jt. Hony. Secretary I. M. A., Central Council regarding the reservations of more posts in the I. M. S. for European members in the I. M. S. Cadre, was read and fully discussed and it was resolved as follows:—

" That this meeting of the Delhi Branch of I. M. A. records its emphatic protest against the scheme for reorganisation of the I. M. S. as given in the recent communique of Government of India and considers this scheme, as most retrograde, reactionary and against the professed policy of Indianisation of the Service.

" This meeting further requests the Central Council of the I. M. A. to take up the matter in right earnest and have the united protest of the Central Legislatures recorded against the imposition on their heads before the inception of the much adumberated Provincial autonomy."

With a vote of thanks to the Chair the meeting dissolved and was followed by the annual dinner (Indian) in which sixteen members participated.

G. N. KHANNA,
Honorary Secretary.

* * * *

ANNUAL REPORT, DELHI BRANCH, FOR THE FINANCIAL YEAR ENDING 30TH SEPTEMBER, 1936.

PRESIDENT, LADIES AND GENTLEMEN,

On behalf of the Executive Committee I have the previlege to submit the report for the year ending 30th September, 1936.

Delhi Branch has been, through another year of its activities, this being the fourth year of its existence, with a total membership of 30 on its rolls at the close of the year. During the year two members resigned, one died, while the names of two were removed due to non-payment of arrears and one new

member joined. Members of the Executive Committee are as follows:—

President—Dr. J. K. Sen, L.M. & S.

Honorary Secretary & Treasurer—Dr. G. N. Khanna, M.B.B.S.

Other members—Drs. P. N. Bhargava, M.B., M.R.C.P., Mrs. C. Solomon, B.A., M.B.B.S., B. C. Sen, L.R.C.P. & S., Shiv Ram Chopra, M.B.B.S., S. C. Sen, D.M.R.E., A. Roy Chowdhury, M.B., S. N. Mitter, D.O.M.S.

Representative to Central Council—Dr. M. S. Bazaz, M.B.

During the course of the year fourteen meetings were held as detailed below:—

Executive Committee meetings	...	3
Special Committee ...	...	2
General Meetings ...	...	8
Annual General Meeting and dinner	...	1
TOTAL	...	14

Financial position of the branch is satisfactory showing a closing balance of Rs. 825-3-0 at the end of the year, out of which a sum of Rs. 500-0 has been ear-marked for Delhi Medical Association Library Fund as decided at the last annual general meeting. But I regret to inform you that a sum of Rs. 105-8-0 is still due as arrears from the members in comparison to Rs. 68-0 in the previous year. Partly due to economic conditions and partly due to ban by the Punjab Government on service men being still in force very few new members have joined this year. Vigorous efforts have to be made to collect the arrears and increase the membership this year.

Notable feature of the year was the holding of a joint meeting of the Delhi Branches of All-India Medical Licentiates' Association and the I. M. A. on the 20th September to observe the Anti-Indian Medical Council Day. Several important resolutions were passed on the subject by the members of both and a Joint Sub-Committee was duly elected to do the necessary propaganda to have the Indian Medical Council Act suitably amended. Members of the Sub-Committee are as follows:—

Drs. A. Roy Chowdhury, G. N. Khanna, S. C. Sen, K. C. Wohra, K. N. Sharma, Bakhtawar Singh, R. B. Hari Ram, L.M.P. and Sharif Hussain, L.M.P.

On the social side we advanced another step as we had our first annual dinner this year at the Delhi Medical Association House in April, 1936. I hope it will remain as a regular yearly function in future.

Before concluding I offer apologies for our shortcomings, if any. I thank all the members, specially the President Dr. J. K. Sen and the Executive Committee members for their kind co-operation and guidance in carrying out the management of the Branch smoothly and successfully. Gentlemen, on your behalf I offer thanks to the President and members of the Delhi Medical Association for giving us all the courtesy and facilities during the year as usual.

G. N. KHANNA,
Honorary Secretary.

MOTIHARI BRANCH

Proceedings of the annual meeting of the Motihari District Branch of the Indian Medical Association held on the 18th April, 1937.

Present—Rai Bahadur Dr. T. C. Guha (President), (2) Rai Bahadur Dr. Thakur Ram Dhari Sinha, L.M.P., (3) Dr. Kailash Behari Sahay, M.B., D.T.M., (4) Dr. Ramesh Chandra Ray, L.M.P., (5) Dr. Harishanker Prasad, M.B., B.S., (6) Dr. Nalini Chandra Sarkar, M.B., (7) Dr. Banwari Lall, M.B., B.S., (8) Dr. Shyama Kant Verma, M.B., B.S., and (9) Dr. Kanti Bhushan Banerjee, L.M.P.

I. Proceedings of the last meeting were read and confirmed.

II. Letter of the Joint Secretary, Indian Medical Association, dated the 28th February, 1937, re: non-payment of the contribution of Rs. 12/- by 4 members of this Branch was read. It was unanimously resolved to request the members who are in arrears to pay up their annual dues of Rs. 4 each within a month as they had the full privilege of receiving the Association's Journal throughout the past year.

III. The following were unanimously elected President and Secretary for the year 1937-38, *viz.*, (1) Rai Bahadur Dr. T. C. Guha, President and (2) Dr. Shyama Kant Verma, M.B., B.S., Secretary.

IV. It was unanimously resolved to acknowledge with thanks the services of the retiring Secretary Dr. Harishankar Prasad, M.B., B.S., to the Branch.

V. Thanks were also given to Dr. R. C. Ray for reading a paper regarding his personal impression of the incidence of leprosy in Champaran. He is requested to read a detailed paper on the etiology, pathology, diagnosis, prognosis and treatment of leprosy.

Accounts of the last year were passed:

INCOME

	Rs.	As.	P.
Balance of last year	4	7	3
Subscription received from 11 members	44	0	0
TOTAL ...	48	7	3

DISBURSEMENT

Contribution to the Central Council of the Indian Medical Association ...	33	0	0
Money order commission on the above ...	0	8	0
Stationery	0	6	3
Refreshments	4	8	0
TOTAL ...	38	6	3
Balance in hand	10	1	0

H. S. PRASAD, *Secretary.*

T. C. GUHA, *President.*

18-4-37

DEORIA MEDICAL ASSOCIATION

The sixth monthly meeting of the year was held on the 2nd May, 1937, at 2 p.m., at the residence of Dr. S. C. Acharya. The Vice-President occupied the chair.

Most of the members were present in the meeting. A paper on Plague was read by Dr. Acharya, giving a detailed account of its history, etiology and treatment. A second paper on Gonorrhœa was read by Dr. Jagat Singh. The following resolution amongst others, were discussed and then unanimously passed:—

1. In view of the fact that the existing laws relating to Public Health are being inadequate and inoperative in practice, the Minister-in-charge of the Public Health be and is hereby requested to make arrangements for the introduction of fresh legislation for the purpose of making vaccination and inoculation compulsory during epidemic and in affected area and making notification of epidemic diseases like plague, cholera, and small-pox, etc., compulsory.

2. This Association is of opinion that if isolation hospitals are provided for plague, cholera and small-pox, side by side with compulsory vaccination and notification of the above epidemic diseases, the public health of these provinces will be improved to a large extent and the deaths from these diseases will be considerably reduced.

In consideration of these facts, this Association resolves to request the Minister-in-charge of the Public Health to provide for adequate finance for starting isolation hospitals in different parts of these provinces.

S. N. MUKHERJI,
Honorary Secretary.

KARACHI MEDICAL ASSOCIATION

At the Annual General Meeting of the Karachi Medical Association held on Saturday, the 24th April, 1937, the following office-bearers were elected for the ensuing year:—

President—Dr. A. Said.
Vice-President—Dr. C. P. Bhatt.
Honorary Secretary—Dr. Rochiram A. Amesur.
Honorary Jt. Secretary—Dr. S. N. Mistri.
Honorary Treasurer—Dr. N. V. Adalja.
Honorary Librarian—Dr. L. Bhatia.
Honorary Auditor—Dr. H. Jhalla.

Managing Committee: Drs. Thomas Draper, K. Tarabai, Tarachand J. Lalwani, P. P. Lalwani, Popatlal, M.L.A., C. H. Primlani and R. P. Shukla.

R. A. AMESUR,
Honorary Secretary.

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XIIth ANNUAL REPORT

The Managing Committee have great pleasure to place before you the XIIth Annual Report together with the audited Accounts of the Karachi Medical Association (Sind Provincial Branch of the Indian Medical Association) for the year ending 30th September, 1936, for your consideration and adoption.

Membership. During the year under report 16 new members joined, 11 resigned. The total number

on the roll on the 30th September, 1936, was 45. It will be seen that the strength is on the increase. Had several members not left the place and resigned on that account our strength would have been still higher.

Meetings. 12 meetings of the General Body, and 10 meetings of the Managing Committee were held and the attendance at these meetings was always very encouraging. Several Sub-Committee meetings were held and the attendance at these meetings was always very encouraging. Several Sub-Committee meetings in connection with the All-India Medical Conference which was to be held in December, 1936, were held to organise the work. Dr. C. P. Bhatt, M.B.B.S., was elected as Organising Secretary for the Conference.

Lectures. The following lectures were delivered during the period for which our Association is thankful to the lecturers and we hope, the same interest will be taken by the members of the profession both in delivering and in attending the lectures. The lecture-meetings as usual were very well attended and very keen interest was taken both by members and non-members. We issue printed invitations to all qualified medical persons in Karachi, irrespective of whether they are members or non-members. The main object being free exchange of knowledge amongst the members of the profession. We thank non-members for their participation in the professional debates and we hope that they would co-operate with us not only in joining our Association as members but also in uniting for strengthening the Indian Medical Association so that the profession be enabled to achieve self respect and rights as the medical profession in other countries has achieved. Owing to the heavy work of organising the Conference, only the following few lecture-meetings could be held:—

1. " Some Observations on Acute Cirrhosis of Liver " by Dr. Karim, M.B.B.S.
2. " Nephritis " by Dr. Karim, M.B.B.S.
3. " Dental Education in India " by Captain Vaswani, M.B.B.S.
4. " Birth Control Debate " by Dr. Popatlal A. Bhupatkar, M.B.B.S.
5. " Biblical References to the Science and Art of Medicine " by Dr. Thomas Draper, M.R.C.P.
6. " B. Coli Affections of the Urinary Tract " by Dr. Lal Chand Agarwal.

Finances. The opening balance was Rs. 1990-14-8, and the closing balance Rs. 1780-11-8. The balance was short than the previous year by Rs. 210-0-0, which is due to our spending Rs. 456-4-6 on purchasing new books for the Library.

Periodicals. Eleven periodicals were subscribed during the period under report and were circulated amongst the members.

We thank Dr. A Said for supplying Indian Medical Gazette free, for the use of the Association.

Library. During the year under report the 25 volumes were added to the Library.

During the year Dr. A. Said and Dr. R. A. Amesur, attended the All-India Medical Conference as delegates from Karachi Branch of Indian Medical Association, and invited the next conference to Karachi. Fortunately, this time the invitation was accepted.

The Association sincerely thanks Dr. A. Said for his generous heartedness in giving his premises with lights free of cost for the use of the Association. But for this our finances will not be as they are shown.

Dr. N. V. Adalja presented a nice almirah for the Library and has promised to present new medical books worth Rs. 70/-. The Karachi Medical Association is very thankful to him for his generosity.

The members of the Committee thank Dr. R. A. Amesur, Honorary Secretary, and Dr. S. N. Mistri, the Honorary Joint Secretary, for the interest they have taken in the working of the Association, at the cost of their valuable time.

Our thanks are also due to our Honorary Treasurer, Dr. N. V. Adalja and Honorary Auditor Dr. D. H. Jhalla.

R. A. AMESUR,
Honorary Secretary.

JESSORE BRANCH

A meeting of the medical practitioners of Jessore was held in the local Medical Association Hall on Saturday, the 29th May, 1937, with Dr. N. N. Chatterjee as President.

Drs. S. C. Sen Gupta, M.D., F.R.C.S., T. N. Ghosh, M.B., P. C. Ghosh, M.B., of Calcutta were present.

The following resolutions were unanimously passed:—

1. That a branch of the Indian Medical Association be formed at Jessore with the following members:—

Drs. J. R. Dhar, M.B., G. B. Bhattacharyya, L.M.F., N. N. Chatterjee, M.B., M. C. Ganguly, M.B., R. M. Saha, L.M.F., N. C. Banerjee, L.M.F., P. G. Basu, L.M.F., S. C. Sen, M.B., D.P.H., Girindra Nath Dasgupta, M.B. (Magura), Girindra Chandra Gupta, M.B., (Magura), Durgapada Basu, M.B. (Magura).

2. That Dr. J. R. Dhar, M.B., be elected provisional Secretary and Treasurer of the branch.

3. That an Executive Committee (provisional) be formed with the following members:—

Drs. S. C. Sen, N. N. Chatterjee, G. B. Bhattacharjee, P. G. Basu and J. R. Dhar.

4. That Rs. 5/- be fixed as the minimum annual subscription for membership of this Association and that the first instalment should not be less than Rs. 3/-.

5. Dr. S. C. Sengupta and Dr. T. N. Ghosh explained the necessity of a medical association at Jessore and all the members took part in the discussion.

With a vote of thanks to the Chair and the gentlemen present from Calcutta, the meeting terminated.

KHULNA BRANCH

A meeting of the medical practitioners of Khulna was held on Sunday, the 30th May, 1937, at the residence of Dr. N. Bhattacharyya.

The following gentlemen were present:—

Dr. N. N. Bhattacharya, M.B., Capt. N. Ghosh, Civil Surgeon, Drs. P. K. Das, M.B., Murari Mohan Bose, D.H.O., Kalipada Banerjee, M.B., Amulya Chakravarty, M.D., Dwijendra Nath Sen, M.B., Nagendra Nath Bhattacharyya (Junior), Ananta Kumar Maulik, M.B., Surendra Nath Ghosh, L.M.F., Kalipada poi, L.M.F., Bhabaniranjan Chakravarty, L.M.F.

Dr. N. N. Bhattacharjee was elected unanimously President of the meeting and the following resolutions were passed at the meeting.

Resolved that a branch of the Indian Medical Association be formed at Khulna with the above-mentioned twelve members.

The following office-bearers were elected:—
President—Dr. N. N. Bhattacharyya, M.B.
Vice-President—Dr. M. M. Bose, M.B..
Secretary & Treasurer—P. K. Das, M.B.
Asst. Secretary—Dr. K. P. Poi, L.M.F.

Executive Committee Members—Capt. N. Ghosh, M.B., D.T.M., Drs. A. Chakravarty, M.B., Phani Roy, L.M.F., D. N. Sen, M.B., S. C. Ghosh, M.B., and S. N. Ghosh, L.M.F

Resolved that Rs. 5/- be fixed as the annual subscription for membership of this association and that the first instalment should not be less than Rs. 3/-.

SERAMPORE (HOOGHLY) BRANCH

A largely attended meeting of the medical practitioners of Serampore was held at the Raja Kishorilal Goswami Memorial Hall (Town Hall) on Monday, the 31st May, 1937, at 6 p.m.

Dr. Pramatha Nath Mukherjee presided.

Dr. T. N. Ghosh, Organising Secretary, Bengal Provincial Branch of the Indian Medical Association and Dr. K. C. Chaudhuri of Calcutta addressed the gathering on the needs of an organisation amongst medical men and the advantages of joining the Indian Medical Association. This was followed by a lively discussion in which many of the gentlemen present took part.

It was unanimously resolved that the Serompore Medical Association be revived as "The Serampore Branch of the Indian Medical Association."

The following were elected as office-bearers and members of the Executive Committee:—

President—Dr. P. N. Mukherjee, L.M.S.

Vice-Presidents—Drs. N. L. Bhattacharyya, L.M.S., and A. T. Das, M.B.

Hony. Secretaries—Drs. T. P. Bhattacharyya, M.B., D.T.M. and P. K. Bose, M.B.

Asst. Secretaries—Drs. Ganesh De, M.B., S. C. Bhattacharyya, M.B., N. N. Ghoshal, M.B. and S. N. Ghoshal, M.B.

Committee members—Drs. Krishnadhan Laha, M.B., Subodh Mukherjee, M.B., Prafulla Kumar Sen, M.B., Nanda Dulal Paul, L.M.F., Nanda Lal Das, M.B., Nalini Kanta Chatterjee, L.M.P., and Jatindranath Dutta, M.B., D.P.H., D.T.M.

The following were elected representatives to the Bengal Provincial Branch of the I. M. A.:

Drs. T. P. Bhattacharyya, M.B., D.T.M., and Subodh Mukherjee, M.B.

Dr. T. P. Bhattacharyya was elected representative to the Central Council of the I. M. A.

The meeting terminated with a vote of thanks to the Chair.

RANAGHAT BRANCH

A meeting of the medical practitioners of Ranaghat was held on Sunday, the 6th June, 1937, at 12 noon at the dispensary of Dr. Haricharan Ghosh, M.B., who presided over the occasion. Dr. T. N. Ghosh, Organising Secretary, Bengal Provincial Branch of the Indian Medical Association, addressed the gathering on the needs of medical organisation in Bengal. It was then unanimously resolved that a branch of the Indian Medical Association be formed at Ranaghat under the style of "Ranaghat Branch of the Indian Medical Association."

The following gentlemen were elected office-bearers of the Ranaghat Branch:—

President—Dr. Haricharan Ghosh, M.B.

Secretary—Dr. Sailendra Nath Chatterjee, M.B.

Dr. Gourhari Dutta, M.B., was elected a representative to the Bengal Provincial Council of the Indian Medical Association.

NAIHATI BRANCH

A largely attended meeting of the medical practitioners of Naihati was held at the residence of Dr. Siddheswar Majumdar, L.M.S., on Saturday, the 5th June, 1937, at 7-30 p.m. Dr. S. C. Chatterjee, M.B., M.R.C.P. presided over the occasion.

Dr. T. N. Ghosh, M.B., Organising Secretary, Bengal Provincial Branch of the Indian Medical Association, addressed the gathering on the aims and objects of the Indian Medical Association which is the only representative body of the medical practitioners of India. After a short discussion it was unanimously resolved that a branch of the Indian Medical Association be formed at Naihati under the name of "Indian Medical Association, Naihati Branch."

The following gentlemen were elected to form a provisional Committee:—

President—Dr. S. C. Chatterjee, M.B., M.R.C.P.

Vice-President—Dr. Siddheswar Majumdar, L.M.S.

Jt. Secretaries—Drs. Sailesh Chakravarti (senior), M.B., and Ajit Kumar Bose, M.B.

Committee members—Drs. Sadhan Kumar Mitra, M.B., Satyendra Kumar Biswas, M.B., and Daibaki Nandan Sen Gupta, M.B.

With a vote of thanks to the Chair the meeting terminated.

GONDA BRANCH

Under the auspices of the Indian Medical Association, Gonda Branch, Gonda, a clinical lecture on a case of diphtheritic paralysis of unusual interest was delivered by Captain K. Sen Roy, the Civil Surgeon, in the premises of the Sadar Hospital in the evening of the 21st May, 1937. Amongst those present were Drs. S. B. Sinha, B. B. Ganguli, J. P. Srivastava, M. G. Tandan and Miss Lyall. Dr. Sen Roy began with reading out the history of the case after which the patient, a boy of ten years of age was examined by the members present.

History of the past illness. Murli Dhar, 10 years, Hindu male, went to dine in the night of the 18th instant. The following morning he had two motions, complained of pain in the abdomen and later on he said that his pain was going towards the chest. Ultimately, he felt that he could not swallow anything and his throat was blocked (*Galâ rundh gaya*). He was taken to the Colonelganj Dispensary, where the Medical Officer-in-Charge probably did a stomach wash and gave an enema. He vomited out the medicine which was administered orally and he could not speak. There was also a marked drooping of the eye-lids. Throughout, however, the child was conscious and could make signs. He continued in the same condition the whole day and night. Then he was brought to the Sadar Hospital, Gonda, at 6-30 a.m. on the 20th May, 1937.

Physical examination. The general condition of the patient was not good on admission. His neck was flaccid and would droop towards any side unless supported. There was a complete ptosis of eye-lids, and on opening the lids a slight dilatation of the pupils was found. He could neither open his mouth nor put out his tongue.

Temperature—on admission, 98·2°F and in the evening, 99·8°F. Pulse—130 per minute. Tongue—

furred and coated. Throat—congested, no membrane was seen. Tonsils—were a bit enlarged. Eyes—showed partial paralysis of accommodation. Nervous System—normal. Reflexes—normal. Lungs—normal. Heart—normal, but rapid. Abdomen—normal. Urine—Sp. Gr.-1010. Reaction-acid. Albumin-nil. Sugar-nil.

Treatment. (1) Enema saponis was given. (2) Rum m xx with aqua up to 4 dr. every 4 hours. (3) Antidiphtheritic serum 5000 units (M. L. B.) injected intramuscularly on the day of admission and 5000 units (M. L. B.) subsequently. (4) Mandl's throat paint.

The speaker pointed out that the case was evidently one of paralysis due to laryngeal diphtheria, which, as a rule, causes less toxæmic symptoms and less of temperature as compared to faucial. When he examined the throat he found it congested, but he did not examine the larynx as the boy was in great distress. The marked symptoms in the case were (i) regurgitation of water and fluids, (ii) the nasal twang and inability to speak, (iii) ocular paralysis almost absolute paralysis of the eye-ball. Fingers could be seen as far as the field of vision allowed without movement of the eye-ball, (iv) paralysis of the soft palate. Even the muscles of the neck and the spine were affected. Captain Sen Roy went on to say that the case was one of clear diphtheritic paralysis and the response to the treatment was very quick, so much so that if there had been the slighest delay in the administration of anti-diphtheritic serum, the result would have been probably fatal. There could not be any suspicion of poisoning as the Medical Officer of Colonelganj Dispensary seemed to think. The speaker further indicated the dosage for cases of diphtheria given in the Practitioner's Library of Medicine and Surgery, *vide* Vol. VII, pages 9-12 (See footnote).

Captain Sen Roy pointed out the remarkable fact that though authorities were agreed that paralysis usually comes on during the end of the third or the beginning of the fourth week, in this case, the onset appeared to be extremely sudden and would have rapidly become fatal if prompt measures had not been taken. Drs. Ganguli, Srivastava, Lyall and M. G. Tandan then took part in the discussion.

Dr. Sinha pointed out that the prominent symptoms in this case were the acute onset with diarrhœa, abdominal pain, stiffness in the chest muscles later followed by almost complete blocking of the throat with paralysis of the soft palate and the muscles of the eye. Nasal twang, regurgitation of fluids through nose, ptosis and paralysis of accommodation completed the clinical picture. Though the pupils were dilated the light reflex was maintained throughout. Evidently the initial cough or croup was missed because as pointed out in the Practitioner's Library, page 413, Vol. IX. " The diagnosis is usually apparent but at times a diphtheric sore throat may go unrecognised and only the subsequent palsies call attention to the probable nature of the original infection. There was also no question of a differential diagnosis in this case because tonsillar palsy (if such a thing could be possible independently of diphtheria), poliomyelitis or encephalitis or poisoning by dhatura, etc., could not be thought of. It was doubtful if a membrane could be seen on the larynx at this late stage. Moreover, the quick response of the child to the serum clinched the diagnosis clinically. The speaker pointed out that roughly percentage of paralysis due to diphtheria was about 15 to 20% in all cases of diphtheria.

It was also sugested by Captain Sen Roy that a smear should be stained for Klebs Lœfflers bacillus and the same done in the case of the other 3 children, the brothers of the patient.

With a vote of thanks to the lecturer, the meeting came to a close.

I. B. SINHA, M.B.B.S.,
Hony. Secretary.

	Mild cases units	Early moderate	Late moderate and early severe	Severe and malignant
Infants 10-30 lb. in weight—under 2 years	2000—3000	3000—5000	5000—10000	1500—10000
Children 30-90 lb. in weight—under 15 years	3000—4000	4000—10000	10000—15000	10000—20000
Adults 90 lb. and over in weight	3000—5000	5000—10000	10000—20000	20000—50000
Method of administration advised	Intramuscular	Intramuscular	Intravenous	Intravenous

MIDNAPUR BRANCH

A meeting of the members of the medical profession of Midnapore was held at the residence of Dr. Surendranath Sen Gupta on Sunday, the 20th June, 1937, at 7-30 p.m. Dr. T. N. Ghosh, Organising Secretary, Bengal Provincial Branch, who was on a visit to Midnapore, explained to the gathering the aims and ideals of the Indian Medical Association. After some discussion the following resolutions were passed unanimously:—

1. That a branch of the Indian Medical Association be formed at Midnapore under the style of "Midnapore Branch of the Indian Medical Association."

2. That the following gentlemen be elected office-bearers:—

Secretary—Dr. Khitish Ch. Sarbadhikary, M.B.

Representatives to the Provincial Council—Drs. Ushanath Sen Gupta, M.B., and Khitish Ch. Sarbadhikary, M.B.

Representative to the Central Council—Dr. Dibyendu Sundar Ray, M.B.

Dr. S. N. Sen Gupta was At Home to the members at the conclusion of the meeting.

IMPROVING INDIA'S FOODS

An analysis of some 200 common Indian foods, prefaced by a summary of modern ideas about diet, is given in the "Health Bulletin" on "The Nutritive Value of Indian Foods and the Planning of Satisfactory Diets" just issued by the Director, Nutrition Research Laboratories, Conoor.

The publication is a part of the move to popularise the results of nutrition researches. In the early years of nutrition work the first objective was to get together the scientific data on which practical work could be extended to the homes of the people. This material has since been collected by the workers at the Nutrition Research Laboratories, and is now being made available to the public.

In the Bulletin on the "Nutritive Value of Indian Foods and the Planning of Satisfactory Diets" an account is first given of calorie requirements and standards suitable for the various age and sex groups in India are suggested. Next, protein, fat, and various vitamins and minerals are dealt with, with special emphasis on the minimum requirements of each. Malnutrition and effect of cooking on nutritive value are also discussed.

Here is an interesting excerpt from the section on malnutrition:—

A well-balanced diet is essential if growth and development are to take place normally. A badly fed child is often small for its age and thin; its 'weight and height' will be below average. It will fall sick easily. The frequency of minor ailments in school children can be reduced by improving the diet. A certain apathy, a lack of "pep," of enthusiasm for work and play, is characteristic of the malnourished. The state of the skin is a sensitive index of faulty feeding; a rough dry skin, or a skin covered with a papular eruption, suggests faulty feeding. Everybody knows that a well-fed animal exhibits a certain glossiness and silkiness of fur—a 'good coat'—which is not seen in poorly fed animals. Similarly a well-fed human being has a glossy skin and a glow of health. Bright clear eyes are also a sign of satisfactory feeding.

The section on the planning of diets describes the differences between "ill-balanced" and "well-balanced" diets, and the methods to be followed in improving diets. It is pointed out that a really "well-balanced" diet will usually cost a good deal more than ordinary Indian diets of poor quality, and how diets can be improved without great increase in cost is described. The details given are, therefore, likely to be of considerable interest to the public, in particular to those who are in charge of catering in institutions and schools.

Stress is laid on the value of what are called the "protective" foods.

Human beings, and particularly children, says the Bulletin, cannot thrive at their best on a diet largely composed of cereals such as rice, millet, etc., and insufficiently supplemented by other foods. To make good the deficiencies of such a diet, they must consume fair quantities of foods like milk, green vegetables, eggs, fruits, etc. These are sometimes known as the "protective" foods, since they are rich in proteins, vitamins and mineral salts, and protect the body against the ills which result when the diet is largely based on less nutritious foods, such as milled rice. Cod liver oil which is very rich in vitamins A and D, may be classed as a most valuable "protective" food.

In general, diets in India are defective because they do not contain "protective" foods in sufficient abundance. The aim in public health nutrition work in general and planning "well-balanced" diets must be to increase intake of "protective" foods. The classes in the community which are particularly likely to suffer if their diet is defective are infants and growing children, and expectant and nursing mothers.

Even a little milk, we are told, is better than none. The value of skimmed milk, which is considerably cheaper than whole milk, but contains most of its valuable elements, is emphasised. Information is given in tabular statements about protein, fat, carbohydrate, fibre, calcium, phosphorus, iron, and vitamins, and appendices are added with data about the biological value of the proteins of various foods, and the availability of iron in certain foodstuffs.

There are, of course, many kinds of public health nutrition work besides the planning of adequate diets. The task of the nutrition worker is often to make special additions (*e.g.*, milk, cod liver oil, various vitamin-rich preparations) to an unsatisfactory diet rather than to plan the whole diet afresh. Infant feeding is a special subject demanding special knowledge and training. But in all branches of practical dietetics the fundamental principles involved are the same, and an understanding of them is essential for successful work in this field.

It is not only the poor, whose choice in the matter of food is extremely limited, who are ignorant and prejudiced about diet. Plenty of people in India and elsewhere, who could afford themselves to consume and could feed their children on an excellent diet, do not in fact do so. One can readily find, among children of the more prosperous classes, of cases of serious malnutrition and food deficiency disease.

In drawing up the new diet schedule, or in assessing the value of an existing schedule, it is essential to know whether enough food is being provided. It might be thought that it is easy enough to discover food deficiency, for such deficiency must cause hunger. But experience has shown that human beings can adapt themselves, at a low level of vitality and with their powers impaired, to an insufficient ration, and scarcely realise that they are under-fed. The nutrition worker, in setting up standards of food requirements, ignores this remarkable faculty of the body to adapt itself to semi-starvation. His standard of food intake implies full satisfaction, enough to enable human beings to lead an energetic life at a reasonably high level of working capacity.

Dr. Aykroyd, Director of the Nutrition Research Laboratories, states in an introduction that the purpose of the Bulletin is to summarise available knowledge about the nutritive value of Indian foodstuffs for the benefit of public health workers, medical practitioners, superintendents of residential institutions and others interested in practical dietetics.

By its wealth of details the Bulletin is a rich source of educational and propaganda material for those whose task it is to try and improve the health and well-being of the people, both young and old.

MEDICAL RESEARCH IN INDIA

What is the etiology of epidemic dropsy? What is the incidence of maternal mortality and what are the causes? What is the nutritive value of Indian foods? Are Indians more prone to tuberculosis than others?

These are some of the many questions to which answers are given in a report, just published, of the Scientific Advisory Board of the Indian Research Fund Association, on medical researches conducted under the ægis of the Association, during the year, 1936.

Though in its scientific details a highly technical document, the report is yet not without its interest even to the lay reader.

Amongst the subjects that received the attention of the research workers during the year, mention may be made of cholera, anti-malarial drugs, malaria transmission, black-water fever, nutrition, leprosy, plague, anti-rabic vaccine, tuberculosis, indigenous drugs, maternal mortality, drug addiction, cancer, typhus, snake venoms, epidemic dropsy and kala-azar, and the problems presented by each were investigated in their different aspects with particular reference to Indian conditions.

Epidemic Dropsy

The epidemic dropsy had two main lines of work: (1) the study of patients suffering from epidemic dropsy, and (2) a search for evidence implicating rice or other articles in the causation of the disease.

The results obtained so far indicate that there is some infective agent in the causation of epidemic dropsy and that the infective process exhibits in the initial stages varying degrees of intestinal disturbances leading, in the majority of patients, to a change in the intestinal bacteriological flora.

A study of rice samples was made in the laboratory and in the field. The results so far obtained suggest some etiological connection of rice with the disease. A more detailed study of the opacities in rice grains points to the existence of two causative factors; a transmissible plant virus which leads to a later invasion of the damaged grain by soil bacteria.

In addition two field investigations were carried out, one at the Twenty-Lines tea garden in Assam and the other at Jamshedpur, Bihar. The data collected at these investigations, together with those obtained at previous investigations were analysed with a view primarily to test the validity or otherwise of the three important theory of epidemic dropsy, namely: (1) the rice theory, (2) the mustard oil intoxication theory, and (3) the contact infection theory. The object of these enquiries was to narrow

down the issue if possible and indicate the lines along which more exact work might proceed with advantage.

General observations made at the investigation show that two factors closely associated with incidence are age and economic status. Babies in arms entirely escape, toddlers are only exceptionally attacked, young children are only mildly affected, those in the prime of life suffer worst, and the incidence again tends to drop with advance in age.

Bengalis the Worst Sufferers. Again, it has been found that epidemic dropsy is chiefly a disease of the middle classes, and that Bengalis and others who have adopted their habits of living are the worst sufferers. This was demonstrated in a certain part of Calcutta where Bengalis and non-Bengalis of more or less the same economic status lived side by side.

Has Rice anything to do with the Disease? At the places where investigation was conducted, hand-pounded rice was in common use in villages and small towns, but in bigger cities where the grain is imported, milled rice was largely consumed. Outbreaks of epidemic dropsy were as severe amongst communities consuming parboiled and milled rice as in these used to sun-dried and hand-pounded grains. These processes, it is accordingly concluded, are therefore of no significance in the causation of epidemic dropsy.

Conditions of storage of rice were found satisfactory in all places visited. In certain communities each household was found to gather and store its own grain. If infected rice is to be blamed for the causation of the disease, simultaneous infection of a large number of unconnected stores has to be assumed. In other places also, it was not possible to connect different cases to a common source of rice supply.

It is unlikely, says the Report, that a water-soluble toxin elaborated in " infected " rice has anything to do with the etiology of epidemic dropsy, because those who habitually throw away water in which the rice is boiled were found to suffer much more than those who did not.

It has also been found that while the throwing away of rice-water does not afford any safeguard against the occurrence of the disease, other factors common to the members of the family are of importance.

Is Oil Consumption the Cause? No case, says the report, was seen among the non-consumers of mustard oil, but the interpretation of the data is complicated by a number of associated factors of which the lack of controls, due to universality of its use, and the complications introduced by admixtures which the oil undergoes during its distribution to the consumers are the most important. The investigation at Calcutta, however, showed that the low incidence among non-Bengalis was associated with smaller consumption of mustard oil. Again, among two groups, Bengalis and non-Bengalis, the incidence of epidemic dropsy cases rose with a corresponding increase in the quantity of oil consumed. It has however been found that there is a difference in the morbidity rate in the Bengali and non-Bengali communities when consumption of the oil is the same, and this it is difficult to explain on the basis of the oil theory.

Investigations at Jamshedpur yielded suggestive evidence with regard to the " mustard oil theory." Jamshedpur has a population of about 100,000 composed of people from all the different Provinces of India, and a small number of non-Indians. One hundred and eighty-five cases occurred among 52 Bengali families and 37 cases in 14 non-Bengali families. The use of a particular brand of mustard oil, obtained from a local mill supplied within a short period before the commencement of the outbreak was a common feature in a large majority of the affected families. This problem however cannot yet be said to have been solved.

Is Epidemic Dropsy Infectious? As for the infection theory, it was found that contact with cases did increase liability to the disease and this liability increased with the intimacy of contact. But this finding was complicated by the fact that intimate family contact went hand in hand with the consumption of a common diet. On subjecting the data to elaborate statistical analysis, it was found that with a decrease in " congestion," that is, with an increase in the number of rooms per head in a family, there was a corresponding rise in the development of secondary cases in the affected families. This finding, says the report, it is difficult to reconcile with the contact infection theory.

Maternal Mortality

A statistical enquiry into the cases of maternal mortality and morbidity in childbirth in India, is also being carried on in Calcutta and the Added Areas, divided into 32 wards. The intention is to investigate every female death associated with pregnancy, childbirth and the puerperium for the period of one year.

During the period June 15 to October 15, 355 probable maternal deaths were followed up. Three hundred of these deaths were maternal deaths in the sense that they occurred " during pregnancy or within four weeks after the termination of pregnancy or later if illness originated during pregnancy, childbirth or puerperium." Of this series of 300 deaths, 241 were deaths directly due to child bearing, 50 were due to an independent disease concurrent with pregnancy or childbirth, and 9 were due to causes not sufficiently known. Of the 241 deaths directly due to child-bearing, 32·7 per cent. are accounted for by sepsis, 25·3 per cent. by toxæmias, 18·6 per cent. by anæmias, 14·1 per cent. by hæmorrhages, and 5·4 by shock and accident of labour.

Nutrition Research

Important researches in nutrition were carried out during the year at the Pasteur Institute of Southern India, Conoor, and at the All-India Institute of Hygiene and Public Health, Calcutta. Attention was focussed at Conoor on the study of two problems: the nutritive

value of Indian foodstuffs and the diet and "state of nutrition" of the population.

A systematic survey of Indian foodstuffs was undertaken. The first stage of this investigation has been completed, some 200 common foodstuffs having been investigated for energy value and content of proximate principles of calcium, phosphorus and iron. The majority of these foods had not previously been analysed in India.

Simultaneously, the vitamin A and carotene content of some 170 common foods has been determined by the spectrographic method. Investigations have been carried out on the effect of storage and other factors on carotene and vitamin C content, and the interesting observation made that in certain vegetible foods an increase of carotene may take place after harvesting.

The vitamin B2 content of foodstuffs is being studied by biological assay. This investigation is of considerable interest since it has been discovered that one of the common food deficiency diseases in South India—stomatitis—is caused by lack of one or more of the factors present in the vitamin B2 complex.

Data obtained in a survey of foodstuffs have already been used for the investigation and planning of diets; in fact, much of the field work carried out during the year would have been impossible without such information. The effect on nutritive value of Indian cooking methods is also being studied, and attention is being given to the availability of minerals, for instance, iron and calcium in various foods. Though much work yet remains to be done, sufficient material has been accumulated for practical application, and all available information about the nutritive value of Indian foods, together with accounts in simple language, of the principles of nutrition, instructions how to devise "cheap balanced diets," etc., are being passed on to the public in "Health Bulletins."

Tuberculosis

In an enquiry undertaken at the All-India Institute of Hygiene and Public Health, an attempt is being made to elucidate the epidemiology, pathology and bacteriology of tuberculosis in India; in addition, attention is being given to some cognate problems like the part played by solar radiation in influencing tuberculous infection in the tropics, some non-tuberculous diseases which simulate tuberculosis, etc. It has been found that although tuberculosis is not a disease peculiar to the tropics, the complexion of the infection and disease is considerably different from that in other countries. It has now been proved, as a result of these investigations, that the hypersensitivity of the Indian population to endemic infection is more marked than in the highly industrialized and urbanized European population.

A study is also being made of the spread of tuberculosis infection, morbidity and mortality in infected households, especially among children below 15 years.

Indigenous Drugs

The study of some of the inorganic preparations of indigenous medicines was continued, and investigations on *Banga Bhasma* (calcined tin) and *Lauha Bhasma* (calcined iron) were completed and results published. Crude oxides of tin have been used in the old Hindu medicine in the treatment of skin diseases, and in view of the fact that there is a tendency for this metal to accumulate in the system, these observations are rather interesting. It has been observed that workers in tin mines did not suffer from furuncles, and based on this observation, stannoxyl was introduced in the treatment of furunculosis.

Advanced Knowledge of Ancient Hindus

A study of *Lauha Bhasma*, says the report, shows that ancient Hindus appear to have possessed a more advanced knowledge of the uses of iron, and appreciated that iron preparations should be administered in an assimilable form. *Swarna Bhasma* is now being studied.

Drug Addiction Theory

There were also interesting investigations on drug addiction. Studies on the effects produced by hemp drugs in all its common forms, *ganja*, *charas*, and *bhang*, were carried out both in man and laboratory animals. There were also studies on the water content in the blood of opium addicts, both before and after withdrawal, as well as during the course of treatment. As a result of these investigations, new lines of treatment have been suggested which are now being tried.

Studies in Snake Vemon

There were also, during the year, studies on the action of snake venoms and some interesting results have been obtained in connection with their hæmolytic properties.

Anti-Malarial Drugs

The principal object of anti-malarial drugs enquiry, for which the Director, Malaria Survey of India, was himself responsible, was to popularize the use of cinchona alkaloids and to find out what effects short courses of treatment given to all cases of fever have on the prevalence of the disease under rural conditions. This enquiry was carried out in a village near Karnal during the previous malaria season and included house to house visits to detect cases of fever, treatment of fever cases by cinchona febrifuge, weekly blood and spleen examination by accurate scientific methods, and experiments on monkeys to test the anti-malarial value of certain drugs.

MEDICAL NOTES AND NEWS

THE FIFTH INTERNATIONAL HOSPITAL CONGRESS

The Fifth International Hospital Congress will be held at Paris from 5th July, to 11th July, 1937. The French Hospital Federation is organising this event in agreement with the Executive Committee of the International Hospital Association. The special attraction of this Congress is that it will be held during the International Exhibition which, under the title " Art and Technique," will unite in collaboration of more than fifty States thus enabling the members of the Congress to compare the achievements of their own special activity with those that will be shown in all other branches of human activity. Excellent arrangements have also been made to conduct tours and excursions after the Congress.

The programme of the Congress is given below.

MONDAY, 5TH JULY.

3 p.m.—Formal opening of the Congress and first plenary session.

(1) Speeches of welcome.

(2) Lecture by Prof. Roussy, Paris on " the hospitalisation in France of patients suffering from cancer," with the collaboration of Mr. Bley, administrative director of the Cancer Institute.

(3) Discussion.

6 p.m.—Reception at the Hotel de Ville, Paris.

TUESDAY, 6TH JULY.

9 a.m.—Second plenary session.

(1) " The historical development and present position of the Hospital in France." Speaker: M. Cros-Mayrevielle, Narbonne.

(2) " General principles of Hospital organisation and construction in France." Speakers: Prof. Piechaud and Dr. Latier, Bordeaux.

(3) " Male and female nurses in France." Speaker: M. Chenevier, Paris.

(4) " Social Service in France." Speaker: Prof. Parisot, Nancy.

2 p.m.—Meetings of Study Committees and their Sub-Committees, according to order of business previously arranged by the respective chairmen.

AGENDA: Committees Nos. I and VI. " The technique of building construction for the care of cancer patients."

5 p.m.—Private session of the Administrative Council of the International Hospital Association.

WEDNESDAY, 7TH JULY.

9 a.m.—Third plenary session.

SUBJECT: " How can the Hospital increase its income and reduce its expenditure without detriment to its works."

(1) General remarks—Speaker: Dr. Frey, Berne.

(2) Standardisation in the Hospital. Speaker: Dr. Malcolm T. Mac. Eachern, Chicago.

(3) Standardisation. Speaker: Dr. Ralf Zeitler, Berlin

(4) Construction and Equipment Speaker: Dr. Uklein, Prague.

2 p.m.—Technical visits.

3 p.m.—Study Committee III: The Standard Diets in the various countries.

5 p.m.—Study Committee XI: Air—Defence of Hospitals.

THURSDAY, 8TH JULY.

9 a.m.—Meeting of Study Committees and their Sub-Committees according to order of business previously arranged by the respective chairmen.

AGENDA: (As at present arranged), Plenary session of Study Committees III and VIII along with Committees I, II and VI. Subject: The Sickroom. Speakers: Dr. Frey, Berne; Abbe Rekas, Lwow, Architect Stevens, Boston.

11 a.m.—Study Committee III: Reporter: Dr. Balogh, Debrecen.

3 p.m.—Sub-Committee on the Moral and Spiritual Care of the Sick.

SUBJECT: Psycho-therapeutic possibilities in spiritual care in the Hospital. What assistance can the spiritual director obtain from the Administration. Modern methods in the spiritual care of the Sick. Co-operation between the doctor and the spiritual director and how it can be secured.

6 p.m.—Sub-Committee on Hospital Libraries.

FRIDAY, 9TH JULY.

9 a.m.—Fourth plenary session.

SUBJECT: The methodical organisation of Hospital services.

(1) The national plan of hospital organisation, Speaker: M. Sarraz-Bournet, Paris.

(2) National and regional planning of hospitals services—M. H. L. Eason, Esq., C.B., C.M.G., M.D., M.S., London.

(3) National and regional planning of hospital activities. Speaker: Prof. Gramarossa, Turin.

(4) National and regional economy in hospital construction. Speaker: Herr Distel, Architect, Hamburg.

2 p.m.—Technical visits.

5 p.m.—Study Committee V.

AGENDA: Amendment of Constitution. Speaker: Dr. Mouttet, Berne, as chairman of the Study Committee on legal Questions. At his meeting only members of the Study Committee on legal questions have the right to vote but all authorised members of the Administrative Council of the I. H. A. are invited to be present.

SATURDAY, 10TH JULY.

9 a.m.—Fifth plenary session.

SUBJECTS:

(1) Visiting the patient in the hospital. Speaker: Dr. Mouttet, Berne.

(2) The rights of the hospital in regard to documents drawn up for the service of the patient (films, graphs, etc.) Speaker: Dr. Plane, Nuremberg.

(3) The problem of the hospitalisation of mental cases. Speaker: (a) General observations, Dr. Hincks, Toronto; (b) Buildings, Prof. Griffini, Milan.

3 p.m.—Meeting of the Administrative Council of the I.H.A.

AGENDA: (a) General business; (b) amendment of Constitution in the event of the new regulation being accepted, a general meeting of the new Association will immediately be held. Elections.

SUNDAY, 11TH JULY.

9 a.m.—Sixth plenary session.

(1) The hospital and its publicity and propaganda and the Press. Speaker: Abbe Svoboda, Vienna.

(2) The hospital and publicity: educating the public and the Press. Speaker: M. Homer Wickenden, New York.

(3) General Problems of Nursing. Speaker: Lady Superintendent Duff-Grant, Manchester.

(4) The training of the Nurse from the standpoint of the spirit and the work of the hospital. Speaker: Sorella A. M. Gattaneo della Volta, della Croce Rossa Italiana, Genova.

3 p.m.—Reports and resolutions by Study Committees.

6 p.m.—Formal closing of the Congress.

STATUS OF DIATHERMY AND SHORT WAVE DIATHERMY

Medical diathermy is the use, for therapeutic purposes, of heat generated in the body tissues by high frequency currents, insufficient in amount, however, to produce temperature high enough to destroy the tissues or impair their vitality. These currents are applied locally by three methods: (1) with contact metal electrode, (2) with a high frequency alternating electric field electrode or (3) with a high frequency electromagnetic field coil.

The first method is the one by which conventional diathermy is applied. The frequency of oscillations is usually from one-half million to two million cycles per second.

The second method for the local application of diathermy currents is the use of a high frequency electric field. The freuency of oscillations may be from ten million to a hundred million cycles per second. The electrodes are not in contact with the skin, as conventional medical diathermy electrodes are. These short wavè diathermy electrodes are made of metal insulated by rubber or felt. The electrodes are so encased as to prevent arcing from the metal to the skin. When applied they are usually separated from the skin by a half inch layer of dry felt or towels. The towel or felt is placed between the electrodes and the skin to prevent the accumulation of surface moisture into small conducting areas, which might produce burns.

The methods of applying the electric field that have been accepted by the Council of Physical Therapy are those making use of double cuff electrodes so that the part to be treated is midway between and air-spaced electrodes. Ordinarily, cuffs are placed them. The double cuff method, according to the experiments submitted to the Council, always showed superior heating of the deep tissues of the human thigh over the pad electrode method. In fact, this mode of application of electric field electrodes was the only one in these experiments that insured better heating of the deep tissues than was obtained with conventional diathermy employing contact electrodes applied opposite each other. The Council has not accepted pad electrodes for use with the electric field method. Physicians buying short wave diathermy machines should consult the published acceptance of these machines regarding their relative efficiency, and furnished accessories.

Air-spaced electrodes for use with the electric field have been accepted by the Council for certain techniques; for example, when placed on the same side of the part to be treated, and in some instances when applied on either side of the part.

The third method of heating tissues by high frequency currents is by electromagnetic fields, or so-called electromagnetic induction. In this method the current is carried to the patient through a flexible, heavily insulated cable, which is wound around the part to be treated in the forms of coils or loops The part under treatment is separated from the coil or loop by a towel for the reasons mentioned.

Burns may occur with any method of applying short wave medical diathermy as well as with the contact metal electrodes of conventional diathermy. The manufacturers of short wave machines claimed in their early advertising matter that burns were impossible. The council was unable to accept these claims, since evidence was available that burns did occur.

To avoid burns, several layers of absorbent material are placed between the electrodes or coils and the skin, to absorb perspiration. The collection of moisture between the skin and the electrodes would cause a concentration of energy at these points, and burns would result if the patient did not inform the operator that there was a burning sensation. The patients who have been burned have had a distinct sensation of burning. This would be expected as the subcutaneous tissues are always warmer than the

deeper tissues directly under the electrodes. Such burns resemble those obtained by electroagulation and they are slow in healing.

The effects of common electric currents when applied to the body tissues may be thermal, chemical or mechanical in nature, depending on the physical characteristics of the current. High frequency currents apparently avoid the mechanical and chemical effects but display the ability to heat the body tissues through which they pass. At the present time it is believed that the local physiologic effects of the three methods of applying high frequency currents aforementioned are limited to the effects of the heat produced.

So far as competent investigators have been able to determine, there is no demonstrable, selective thermal action, or specific biologic or bactericidal actions in vivo that may be attributed to short wave diathermy. To date, the effects produced can be explained only on the basis of the generation of heat.

The conditions in which heat is a beneficial adjunct in treatment are to be found in the Handbook of Physical Therapy published by the American Medical Associations. (Published by the American Council on Physical Therapy: *Journal of American Medical Association*, April 24, 1937, pages 1409-10).

RURAL HYGIENE CONFERENCE

The following are the representatives of India at the Rural Hygiene Conference which will be held under the auspices of the League of Nations at Bandoeng in Java next August:—

(1) Sir Mirza Muhammad Ismail, K.C.I.E., O.B.E., Dewan of Mysore.

(2) Lt.-Col. E. Cotter, I.M.S., Deputy Public Health Commissioner (designate) with the Government of India.

(3) Major H. W. Mulligan, I.M.S., Officiating Director, Malaria Survey of India, Kasauli.

(4) Dr. W. R. Aykroyd, Director, Nutritional Research, Coonoor.

(5) Lt.-Col. A. C. Chatterjee, I.M.S., Director of Public Health, Bengal, (Representative of the Government of Bengal).

(6) Mr. A. F. I. Brayne, M.C., C.I.E., I.C.S., Commissioner of Rural Reconstruction, Punjab. (Representative of the Government of the Punjab).

(7) Dr. Saiyid Mojibur Rahman, Officiating Personal Assistant to the Director of Public Health, Bihar and Officer in charge, Public Health Bureau, Bihar. (Representative of the Government of Bihar).

(8) Dr. Paul Russell, Malaria Officer, Madras. (Representative of the Government of Madras).

(9) Dr. R. Row, Member of the Scientific Advisory Board, Indian Research Fund Association.

(10) Dr. C. F. Chenoy, Deputy Director of Public Health, Hyderabad. (Representative of the Hyderabad State).

(11) Dr. P. Parthasarathi, Director of Health, Mysore. (Representative of the Mysore State).

(12) Dr. Spencer Hatch, District Secretary, Y. M. C. A. (Representative of Travancore and Cochin States).

(13) Raj Kumar Sahib Sreeshesa Pratap Singh Deo, Home and Development Member, Dhenkanal State.

Sir Mirza Muhammad Ismail will lead the delegation.

NO MORE NOBEL PRIZES FOR GERMANS

As recently told in the daily press, the German Government on January 30 forbade on political grounds the future acceptance of a Nobel Prize by a German. As an alternative there has been established a "German National Prize for Art and Science," which will consist of about 100,000 marks, to be distributed annually among three deserving Germans.

It is interesting to note in this connection how many Germans have been awarded the Nobel Prize, which has been distributed almost uninterruptedly since 1901. The Nobel Prize medicine and physiology has been awarded to seven Germans: Emil Adolf von Behring, Robert Koch, Paul Ehrlich, Alberecht Kossel,, Otto Meyerhof, Otto Warburg and latterly to the zoologist Hans Spemann in 1935. The chemistry prize was received by fifteen Germans, the physics prize by twelve, the prize for literature by five and the peace prize by three.

This proud roster of men whose contributions to knowledge have been deemed worthy of the highest honour has now been brought to an end. (*Journal of American Medical Association*, April 17, 1937, p. 1354).

BOOK REVIEWS

THE PRACTICE OF MEDICINE: By Jonathan Campbell Meakins, m.d., ll.d. Size: Medium Quarto, pages 1343, First Edition, 1936. Published by C. V. Mosby & Company, St. Louis, U. S. A.

The author is to be heartily congratulated for the clear, concise and up-to-date manner in which he has presented the various subjects in his book. In the different sections the author considers the symptoms and signs of each disease in details, explains clearly the mechanism of their production and then passes on to the pathogenesis of the disease. He has scrupulously avoided many unnecessary theoretical considerations but has spared no pains to give a vivid clinical picture of each disease supplemented with typical charts, beautiful photographs and coloured illustrations wherever necessary. Nowhere is such avoidance of unnecessary details more evident than during the consideration of treatment. The therapeutic methods advocated by the author in various diseases are based on sound physiological principles. It is pleasing to note that he has strongly deprecated the use of such traditional remedies as calcium preparations in the treatment of intestinal hæmorrhage of typhoid fevers, and digitalis in the cardiac failure of acute infectious fevers.

There are certain minor criticisms to offer: rheumatic fever and influenza should not have been considered under specific infections of naso-pharynx and mouth, neither should typhoid fever have been considered under diseases of the gastro-intestinal tract.

The initial daily dose of 60-90 grains of sodium salicylate in the treatment of acute rheumatic fever is rather small and most authorities would prescribe as large doses as 120-180 grains daily. The dosage of antitoxin in the treatment of a severe case of diphtheria is also small (10,000 to 15,000 units); many would advocate 25,000 to 30,000 units which may be repeated at the end of 12 hours, if necessary. In the treatment of helminthic infections no mention has been made of the use of iron in large doses for the associated anæmia. Similarly, no reference has been made regarding the value of gold salts in rheumatoid arthritis. The section in tropical diseases is not quite up-to-date. It is rather surprising that such valuable remedies as Atebrin in malaria and Urea-stibamine or Neostibosan in kala-azar have not been mentioned in the book. Last of all there is a number of misprints, the most notable among which is Guy's disease instead of Gee's on page 622. It must be emphasized however that in spite of these few blemishes the book presents a wealth of clinical information useful both to the senior students and to the general practitioners. We have no doubt that it will be a valuable addition to any medical library. The get-up is nice and it contains 505 good illustrations with 35 coloured plates.

J. C. B.

THE MEDICAL ANNUAL, 1937: Edited by Tidy & Rendle-Short. Size: Demy 8vo., pages 704. With 173 Text Illustrations, 78 Plates. Published by John Wright & Sons, Ltd. Bristol.

It is with great pleasure that once more we welcome the Medical Annual of 1937 and take this opportunity of congratulating the Editors and Publishers.

It is almost an impossible task to review a book like Medical Annual which deals practically with the whole field of medicine, surgery, midwifery and gynæcology and indeed the Medical Annual has reached such a stage that it needs no further introduction to the medical profession. The Editors have remarked in the introduction " There has been no outstanding achievement in the last twelve months....." still the book will be read by the medical profession not without interest and shall be found not in the least, less useful, than those of the previous years. It remains only to be said that every member of the English-speaking medical profession should possess a copy of the Medical Annual.

S. C. Chatterjee.